ELECTRICAL REVIEW

ILLUSTRATED.

A WEEKLY JOURNAL OF

Electric Light, Power, Telephone, Telegraph and Scientific Progress.

VOL. 19, No. 1. WEEKLY. | NEW YORK, SATURDAY, AUGUST 29, 1891. | $3 per Annum. Single Copies, 10 Cents.

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Entered at Post Office, New York, as Mail Matter of the Second Class.

VIEWS, NEWS AND INTERVIEWS.

Within the next six months electric traction in New York city will develop considerably. This advisedly.

"It is our business policy," said a prominent electrical manufacturer, "never to point our forefinger toward the future and what we will do. We prefer to point our thumb over our shoulder toward the past and what we have done."

Mr. William Butterworth, a son of the Hon. Benjamin Butterworth, ex-Commissioner of Patents, has been appointed private secretary to Commissioner of Patents Simonds.

It's a wise electric railway official who buys his snow-ploughs in August.

"What Staten Island needs most to-day," said Mr. Erastus Wiman, "is development in the interior. Although the edges of the island are fully provided with facilities of transit, the interior is entirely neglected. Now, I am going to suggest that the whole island be covered with a system of electric roads, so that you can get from the edge into the middle of the island as easily as you can now get around it. We could build an immense electric power station somewhere on the water's edge to supply the current for the cars. At the same time we could distribute power throughout the island at a cheap rate. Now, just let me illustrate to you what a great advantage this would be to the people. Supposing you wanted to sew some overalls by machine, all you'd have to do would be to press a button, which would turn on the current, and—we'd do the rest. Do you see? Or you might want to run a sawmill or rock a cradle by electricity. It would be the simplest and yet the greatest thing in the world. And then in the night time the whole island would be illuminated by electric light. I shall simply present this as a suggestion, but I shall at the same time offer sufficient encouragement in the shape of financial assistance to induce the supervisors to consider the matter. I am willing to invest $50,000 in such an enterprise at once. Then I have friends in Boston who will invest $50,000 more, and the people of Staten Island could raise $100,000. The electric power could be obtained cheaply enough to make the scheme profitable."

Staten Island is suffering from an uncertainty of electric lighting at night, and in addition had an attack of Sam Jones last night. Sam became so lurid that the electric light gave up trying to rival him, and went out. But Sam kept on. There was no need of artificial light with such sentences as these corruscating through Prohibition Park: "The fools are in the majority. The woods are full of them, and if you ever go fool-killing, shoot down the next man you meet and you will get him."—*Brooklyn Times.*

"Matters in the electrical department of the World's Fair are progressing favorably," said Chief Electrician John P. Barrett. "I am going about among the manufacturers doing missionary work. This may prevent my attending the Montreal convention, but I hope to get there."

It is reported that the beautiful old elms of New Haven, Conn., are being destroyed by escaping illuminating gas. Would the people of New Haven rather have elms and electric light, or gas and no elms?

It is said that the German Emperor and the distinguished strangers who accompanied him saw nothing during their trip to England that so much excited their wonder and admiration as the applications of electricity to the ordinary uses of life, made by the Marquis of Salisbury at Hatfield. Under the personal superintendence of Lord Salisbury, the river Lea is utilized to generate electricity by means of turbines. His lordship has motors at the house to drive pumping and ice-making machinery, and an air propeller fixed on the roof for ventilating. Lord Salisbury raises hay and corn sheaves to the top of the stacks by electricity, threshes by it, cuts rough grass for ensilage, grinds corn, makes fodder, drives piles, constructs coffer-dams, dredges and pumps sewage for irrigation.

MR. CHARLES R. HUNTLEY, OF BUFFALO, N. Y., PRESIDENT OF THE NATIONAL ELECTRIC LIGHT ASSOCIATION.

A Southern Inter-States Exposition.

Beginning October 1, and running until December 1, a great Southern Inter-States Exposition will be held at Raleigh, N. C. Mr. John T. Patrick is secretary of the exposition, and F. B. Chilton, general manager. This will be an exhibit of the products of Southern farms, orchards, gardens, forests, mines and factories.

The South is to day, probably, the most promising section of our country and electrical manufacturers would do well to cultivate this field. Printed information may be obtained from Mr. Patrick.

Edison Relates Some Lamp History.

"Won't you tell me about the first carbon lamp you ever made?" asked a New York *Morning Journal* man of Mr. Edison.

"Ah, that is a story. The carbon of the first lamp was made of a spool of Clark's thread. All night, Batchelor, my assistant—the greatest and best of my assistants, the man of infinite patience and indefatigable persistence—worked beside me. The next day we worked all day and then all night again, and at the end of that time we had produced one carbon out of a spool of Clark's thread.

"Having made it, it was necessary to take it to the glass-blower's house. With the utmost precaution, Batchelor took up the precious carbon, and I marched after him, as if guarding a mighty treasure, to the glass-blower's cubby-hole. To our consternation, just as we reached the glass-blower's bench, the wretched carbon broke.

"Batchelor turned around and looked at me and said: 'Edison, we won't sleep till we get one.'"

At the recollection, Edison lay back in his chair and laughed heartily. When he had recovered from the fit, he said:

"That was one of Batchelor's perpetual phrases, which he had said to me a hundred times before, and which I said to him. We turned back to the main laboratory and set to work again.

"It was late in the afternoon before we had produced another perfect carbon. The same procession as in the morning passed to the glass-blower's den. It was safely deposited on a bench, where Batchelor laid it down, when a jeweler's screw-driver—a very little utensil, as you know—rolled down and broke the carbon again.

"But we turned back again, and before night the carbon was completed and inserted in the lamp. The lamp was exhausted of air and sealed, the current turned on and the light that is to be the light of the world met our eyes for the first time in all its beauty."

THE MONTREAL CONVENTION.

THE OFFICERS OF THE NATIONAL ELECTRIC LIGHT ASSOCIATION—THE EXHIBITION—SPECIAL TRAIN FROM NEW YORK.

The culmination of six months' arduous labor on the part of the officers of the National Electric Light Association and a number of the prominent citizens of Montreal, will be witnessed by the members of the Association and their friends within a few days. The selection of a northern city for the summer meeting place was apparently a happy one. The people and city officials of Montreal have labored enthusiastically in the cause, and Montreal cannot but be greatly benefited by the result of entertaining the prominent and progressive men who make up the National Electric Light Association.

The portraits presented herewith are excellent likenesses of President Charles R. Huntley, of Buffalo, N. Y.; Mr. Albert Corriveau and Prof. Henry T. Bovey, of Montreal. Upon these gentlemen has fallen a large share of the work of preparation for the present meeting.

The Electrical Exhibition, under the skillful management of Gen. C. H. Barney, will probably be the largest affair of the kind ever attempted in this country.

Arrangements have been made for a special train to leave New York *via* the N. Y. Central Sept. 6, 9 A. M., arriving at Montreal the same evening. Passengers on this train may be assured of a delightful trip, as all the railroad arrangements have been perfected by that experienced traveller and globe-trotter, Mr. C. O. Baker, Jr.

Reduction of Fares.

The People of Flushing, L. I., have long complained of what they call the high rate of fare on the Long Island Railroad. It costs 45 cents for the round trip to New York. Arrangements have been made between the Flushing Electric Railroad and the College Point Ferry Company, by which the round trip can be made for 25 cents. It is a delightful water view trip all the way.

The people of Jamaica will presently be able to travel all the way to the bridge and ferries in Brooklyn for 10 cents. It costs now 60 cents by the Long Island Railroad and 40 cents by the rapid transit. The electric railroad which runs from Jamaica and connects with the elevated railroads in the Twenty-sixth Ward will soon announce a reduction of fare to five cents for the entire distance of six miles. The electric railway company believe that passengers from eastern towns will leave the trains at Jamaica, and that city people will go to Jamaica to take trains for eastern points. Cheap fares will bring a great deal of business to Brooklyn that now comes to New York, because the cost of the trip from the country is the same to either city.

THE PROPHET'S COLUMN.

As the rise and fall of the nations of antiquity may be traced by the study of comparative philology, so the history of any art or industry is reflected in that science, and the number of words which are contributed by a given profession may, to a certain extent, be taken as a measure of its importance. Thus the most influential guild of colonial times was the ship calkers of Boston. In those days a meeting of the calkers was usually held to decide upon political or other questions and was called a "calkers," hence our Latin-looking word "caucus." In this way one word was added to our language; but the electricians have given us a whole dictionary. In this case, certainly, the relative importance of the two industries is correctly represented by the numerical value of the words introduced by each.

In many ways has electricity affected language, and in many other ways will it continue to do so. The ten word restriction of the telegraph and the five minute limit of the long-distance telephone have imparted a telegraphic brevity to our style which is not altogether to be deplored, especially as it quickens the revolt against the long-winded two-volume novel in favor of the short story, which is constructed with some reference to the amount of time at our disposal during this life here upon earth. In speaking of the short story, no less an authority than Edgar Allan Poe says that it is that class of composition which should best fulfill the demands of high genius.

The future of letters and style will be greatly influenced by the phonograph. In fact, by it have those very words themselves been restored to the original meanings which they had in the time of Pliny. How appropriate it is to call the wax record of the phonograph a letter, for that word is from the Latin *linere, litum*, to besmear or rub over as with wax, and one of the first means of writing adopted by primitive man was by graving upon wax-covered tablets with a stylus (hence, our word style), which was a sharp-pointed instrument made originally of metal. But after a Roman schoolmaster was killed by one in the hands of a pupil, horn was substituted. Although destined to play a most important part as an educational adjunct, the phonograph as yet has no place in the schoolroom; but if introduced in its present form, it would make the death of the Roman schoolmaster seem euthanasia, compared with the fate of the modern pedagogue at the hands of the small boy.

The general exchange of phonographic letters throughout the different parts of our country, which is sure to come in time, will have a bracing effect upon the art of elocution, which seems to have been forced into a secondary position by the great magazine and daily newspaper of the present age.

One of the developments which may be confidently expected is the phonographic dictionary, which shall be so constructed that the busy correspondent, by simply touching a button, may have any word properly spelled, pronounced and defined, with the usual etymological data appended, all given in the most approved tones of the elocutionist's art.

Indeed, a phonograph in the elevated trains announcing the stations in the clear, penetrating voice of Senator Ingalls, would be a pleasant relief from the fad for the Slavic languages, in which the guards have indulged for so long a period.

The horological phonograph, which will announce the various hours of the day, with a few remarks appropriate to the time, has not yet made its appearance among us, but will come with the perfected machine. When it does come, it will no longer be necessary to get up in the cold at night to strike a light in order to find out the time, for, by remaining in bed and simply touching a button, the hour, minute, and even second, will be announced to you with all the politeness of a trained servant.

In the art of music the phonograph will work its greatest change. Let the makers of music and musical instruments study this instrument and study it well. Its greatest wonder is yet to be told.

THE PROPHET.

A Prophet Honored in His Own Country.

[From the *American Analyst*, N. Y.]

There is a brilliant contributor to the columns of the ELECTRICAL REVIEW who, through mistaken modesty, perhaps, conceals his identity under the sobriquet of "The Prophet." Who he is we do not know, though his comprehensive mode of thought and daring speculative grasp bring to mind some corresponding characteristics of Nikola Tesla, of whose remarkable lecture on Electricity, last May, before the Institute of Electrical Engineers, an abstract, necessarily too short, was published in the *American Analyst* of August 6. Our readers may remember our reference some months ago to a suggestion of "The Prophet" regarding a telescope in which the usual object glass should be replaced with a specially contrived electric field of large

MR. ALBERT J. CORRIVEAU, OF MONTREAL, RESIDENT MEMBER OF THE EXECUTIVE COMMITTEE, NATIONAL ELECTRIC LIGHT ASSOCIATION.

dimensions. The capacity of such an instrument, could it be constructed, would be enormous, and its revelations correspondingly extensive. "The secrets of the other planets," as the writer declares, "would then be ours." In a subsequent paper, the same ingenious scientist reverts to the electric field lens idea to maintain that it need not be restricted to telescopes. "The essential feature of a microscope is the eye-piece"—we presume he meant the "objective"—which, he continues:

"Should be a minute sphere of perfect glass. The grinding and polishing of such a small globule of glass as is required in a high power microscope is the only limiting factor in microscopy. It is conceivable that an electric field could be formed which would be as small as a mathematical point. What could we see with such a microscope? Fitz James O'Brien gives us, in his 'Diamond Lens,' a beautiful poetic vision of what his hero saw with a lens of immense power which he had constructed out of a large diamond and treated with an electric current. While it is not likely that a powerful electric lens would reveal to our astonished gaze visions of prismatic groves and the beautiful 'Animula' with whom O'Brien's hero fell in love and pined away because he could not speak to her, yet the scientific imagination goes on a flight which quite equals that of the poet."

And here the "scientific imagination" takes, in fact, a leap that condenses in a single short paragraph food for the mind to occupy itself with, to the exclusion of other concerns, for quite a period of time. We are led to infer that if the true poet must be inspired, the true scientist must be a poet. For our "Prophet" concludes his letter in the following words, which we commend to such of our readers as are familiar with John Fiske's "Unseen World."

"This at once brings up the query: What is matter? We are all told that matter is made up of molecules, and that the distances between molecules are immense compared with their size. If we could conceive of a being small enough to exist on a molecule and he should gaze off into space, the nearest molecules would appear to him at such distances as the stars do to us. The idea of a grain of sand containing worlds of its own is too stupendous even for a poet. Yet who can say that such is not the case. Then, to turn to the other extreme, suppose the earth to be an atom, our solar system and, perhaps, our universe, forming a pebble on the shore of some vast ocean space!"

LITERARY.

The September number of *The North American Review* opens with a brilliant reply to Goldwin Smith's paper, entitled "New Light on the Jewish Question," which appeared in *The Review* for August. The author of "Goldwin Smith and the Jews" is Isaac Besht Bendavid, who shows himself to be a man of great learning and ability, as well as a skilled controversialist.

Mr. W. J. Morrison, general agent of the Fort Wayne Electric Company for New York State and Canada, encouraged by the success of his first long literary effort, "Kind Words," will very shortly publish an alternating sequel of equal interest.

The Perkins Company Shuts Down Temporarily.

Owing to over-production during the summer months and the general depression of business, and especially the lamp business, caused by the recent Edison decision, the Perkins Electric Lamp Company have shut down their Manchester, Conn., factory. The factory will start again September 1, as that is about the time the fall trade begins. The company has a bright outlook for a big fall trade.

The *Herald* says the plain English of the continued extension of time in the suit to cancel the Bell telephone patent seems to be that the government recognizes that it has no case. But the *Herald* fails to remind its readers that nobody ever supposed the government had any case, and the only object in bringing the suit was to boom Pan-Electric stock, in other words, to put money into the purse of Mr. Garland, Cleveland's attorney-general.—*Boston Advertiser.*

Electricity and Life.

[By Edward P. Jackson in *The North American Review.*]

It seems to be a pretty well-established fact that electricity may be made at least a powerful stimulant to the growth of plants. May it not be more than a mere stimulant? May it not be an actual creator of life? Beans, rye, corn, oats, barley, peas, potatoes, sunflowers, clover and flax, have all been experimented upon, in some cases with astonishing results. In one series of experiments the seeds were electrified before they were sown; in another, currents were maintained through the soil in which they were planted; and still another, through the atmosphere immediately above the plants. In several instances the yield of fruit was enormously above the average, and in all the growth was unusually luxuriant. Further experiments are in progress, and it is not unlikely that science is about to add another to her long series of beneficent triumphs, another refutation to the croaking philosophy of Malthus and his disciples.

The results of the experiments have, furthermore, a suggestive bearing upon the relation between electricity and that inscrutable something which we call life. If they do not prove them the same, they at least bring them nearer together than any phenomena which have preceded them. When, in the healing art, enfeebled vitality is restored, either wholly or in part, by the skillful application of electricity, nothing is positively demonstrated beyond mere healthful stimulation, the mere awakening of life which already lay dormant in the system, such as might possibly have followed the use of other remedial agents. But here it is not morbid restored to normal conditions, not dormant life reawakened to action. It is apparently the actual development of vitality not preëxistent in the perfectly healthy and normal organisms under treatment. Electricity itself appears to be converted to vitality, as elsewhere it is converted to light, heat and mechanical motion.

Whether life can thus not only be renewed, but actually transfused into the veins, or rather, the nerves of man, remains for physiological science to determine. It has already been shown that a living body is a species of thermo-electric battery, of which the ectoderm and the endoderm are the opposite poles; that the exhilarating effects of a cold plunge, for example, are due simply to the increase of potential from the reduced temperature of the "cold" electrode. But merely setting a battery into operation, or merely increasing its action, is not increasing its inherent voltage, which is what the recent experiments seem to have done for plants.

But do not heat and the active principle of light artificially intensified produce similar effects? The forcing of vegetable growth in hot-houses is an old process and unlike the one in question, both in method and effect. According to the reports given, however, there is a very great difference in the results attained. If this be true, it would seem to indicate more strongly than ever that of all forms of natural force, electricity bears the closest relation to that mysterious form of it which we call life.

Westinghouse.

The Pittsburgh *Chronicle-Telegraph* says that a cablegram received from the agent of the Westinghouse Brake Company, Limited, announces that the Prussian State railways have decided to adopt the quick action brake for all their railways, and to replace what are known as "Carpenter" brakes, which have heretofore been used on quite a number of trains. This decision gives the Westinghouse Company the entire brake business of the German Empire, the brake having previously been adopted by a number of the railways controlled by the different States.

The same paper also says: "Mr. George Westinghouse, Jr., came home to day. Owing to the absence of most of the board of the electric company, there is nothing new in the affairs of the company. He reports everything getting in shape for the reorganization and the issuing of new certificates of stock, which will be done by September 1.

Note on a Subterranean Line in a Cement Culvert.

BY E. BRYLINSKI.

The line referred to consists of three cables and runs between Lyon and La Palisse. Two sections are in iron tubes and have given no trouble; in the third section, which is only 41 kilometres long, 394 faults have occurred since 1885, when the line was put down. The faults may be divided into two categories. The first class are due to lightning, and they are easily recognized. The discharge bursts through the gutta-percha, sometimes leaving a scarcely visible puncture, oxidized and blackened, and if the discharge is violent, several of the strands may be broken. When the gutta-percha is in good condition, the discharge produces several of these faults; but they are easily localized, and when repaired, the insulation of the line is as good as before. A slight discharge will sometimes lower the insulation without giving these definite faults, which can be cut out. The second class of faults is much more serious. The culverts are always more or less full of water, and sometimes, for whole kilometres together, this becomes black and putrid-smelling, the whole of the outer covering of the cables disappear and the gutta-percha core is left bare. It appears that cement held in suspension by the water is deposited on the gutta-percha, which it partly eats away and renders the rest spongy. A number of faults are thus set up which are difficult to localize and remove, as repairing one fault frequently starts another close to it.

Some of the Exhibitors at Montreal.

Below is given a partial list of exhibitors who will be represented at the National Electric Light Convention:

Eureka Tempered Copper Co., North East, Pa.
Chas. A. Schieren & Co., New York.
Standard Underground Cable Co., Pittsburgh, Pa.
Standard Electrical Time Co., New Haven, Conn.
Fort Wayne Electric Co., Fort Wayne, Ind.
Electrical Engineering and Supply Co., Syracuse, N. Y.
Eugene F. Phillips Electrical Works, Limited, Montreal, Can.
Felten & Guilleaume, Cöln, Germany.
International Okonite Co., New York.
Weston Electrical Instrument Co., Newark, N. J.
The Johns-Pratt Co., Hartford, Conn.
Ball Electric Light Co., Toronto, Can.
Interior Conduit and Insulation Co., New York.
Robert Mitchell & Co., Montreal, Can.
Thomson-Houston International Electric Co., Boston, Mass.
Toronto Electrical Construction and Supply Co., Toronto, Can.
H. Ward Leonard, New York.
Dominion Wire Manufacturing Co., Montreal, Can.
T. W. Ness, Montreal, Can.
Edison General Electric Co., New York.
Canadian Electrical Construction, Manufacturing and Supply Co., Montreal, Can.
Norwich Insulated Wire Co., New York.
Excelsior Electric Co., Boston, Mass.
Russell Electric Co,, Boston, Mass.
McGill University, Montreal, Can.
La Boiteaux Electric Motor and Fan Co., Cincinnati, O.
American Phonograph Co., Toronto, Can.
The Electrical Journals.

EXHIBITION NOTES.

The Edison and Thomson-Houston Companies have got their work well under way. They are engaged in laying the wires for the transmission of power which is to be procured from the McGill University for the running of the apparatus which will be put in motion by electric power only. The Fort Wayne Electric Company has made arrangements to transmit its power by an electric generator from the basement of the Windsor Hotel.

The flooring of the rink will be completed in a few days and by next week the electric apparatus will begin arriving for installation in the allotted space.

The Bell Telephone Company has kindly offered to place instruments in different places for the accommodation of those who attend the convention.

The Edison Company have offered to light, with arc and incandescent lights, at their own expense, the tent which is to be placed on the McGill grounds for the conversazione.

The Electric Merchandise Company, Chicago, will be "at home" in Parlors 14 and 16, Windsor Hotel, Montreal, during the convention, and will be represented by Messrs. D. B. Dean and W. R. B. Willcox. An exhibit of some specialties in line material will be made, and also some few sets of the Burton electric heater will be shown in operation.

The Exhibition Committee has received from the North American Phonograph Company information to the effect that they have consented to accept the invitation extended to them. They have promised to make a large display of the phonograph and in such a manner as to make it plain and interesting to those who are not acquainted with its working. A special department will be reserved in this exhibit for the purpose of concerts and lectures. Every visitor will have the privilege of hearing a speech by Gladstone or an aria by Patti as they were originally uttered.

There will also be in operation a number of long-distance telephone instruments, between distant cities and the exhibition.

PROF. HENRY T. BOVEY, OF MONTREAL, CHAIRMAN CITIZENS' COMMITTEE, NATIONAL ELECTRIC LIGHT ASSOCIATION.

Some Boston Opinions on the Incandescent Lamp Situation.

[From the *Commercial Bulletin.*]

The Thomson-Houston is protected either way, for it manufactures its lamps under Sawyer-Man patents and, as it pays the latter a royalty, the Sawyer-Man people must naturally assume all litigation. The Sawyer-Man Company is understood to make a better lamp than the Edison Company, the latter's product selling for about 45 cents, while the former's sells for 65 cents. Until within a year or so, the Sawyer Man Company produced annually more incandescent lamps than the Edison, but such has been the recent growth of the latter company in this direction that it is doubtful if such is now the case. The Edison Company will adopt that plan which brings them in the most money, whether it be to drive the other companies to the wall or to patch up a compromise.

The recent decision rendered in the case of patent rights on incandescent lamps is a far reaching one in more respects than one. The case, it is true, has been taken to the Appellate Court, but among electrical men the opinion is unanimous that the final verdict will be the same as that rendered by Judge Wallace. If the first decision is sustained, the various other companies manufacturing incandescent lamps will be compelled to pay the Edison Company royalties dating back many years, and it is believed that this will "bust" some of them.

This may not result, however, for we are inclined to think that a compromise will be patched up between now and the rendering of the final decision. This compromise must necessarily go between the Edison on the one hand and the Westinghouse Company and United States Electric Company on the other, they being the infringers of Edison's patents. The Sawyer-Man Company is, of course, the great offender besides the United States Electric Company, but as the Westinghouse people control it, all negotiations must be made with them.

The Telephone as an Optical Instrument for Measuring Current.

BY W. WIEN.

The author employs a telephone whose diaphragm consists of a thin corrugated German silver disk similar to those used in aneroid barometers and having a small piece of iron at the center. A flat steel spring is fixed by one end above and parallel to the diaphragm, to the center of which it is connected by a short rod. At the end of the spring is a small galvanometer mirror, which thus follows all the movements of the diaphragm. The mirror throws on the scale the image of a slit, which is broadened into a band of light when the instrument is traversed by an alternating current. The spring is carefully tuned, by altering its length, to give the same note as the diaphragm. In the make-and-break arrangement, a stretched wire is used, kept in vibration by an electro-magnet. The author prefers this to using a spring, as is usually done, as it is so easy to tune it exactly to the note of the telephone. The instrument will give a deflection—or, rather, a band of light—100 times greater for a sine curve current whose period is in tune with it, than for an equal current not in tune. As a test, ten bridge measurements were made on the same resistance, using first the optical telephone and then a dynamometer, which gave one scale division with 10^{-6} amperes. The mean error with the former was .012 per cent.; with the latter, .11 per cent.; the error when an ordinary telephone was used was not less than .1 per cent. The author sums up his claim for the instrument: First, that it measures, with greater sensitiveness than any other, a pure sine curve current of one definite period and ignores all other currents which may be flowing at the same time; second, the deflection (breadth of band) is directly proportional to the amplitude of this current.

Dixon, Cal.—Dixon Light and Water Company; capital, $60,000.

Leesburg, Fla.—Leesburg Telephone Company; capital, $20,000.

Camden, N. J.—The Diamond Carbon Company; capital, $350,000.

Seattle, Wash.—Home District Telegraph Company; capital, $50,000.

Celina, O.—The Citizens' Fuel, Light and Power Company; capital, $50,000.

Portland, Ore.—North Portland Light and Water Company; capital, $10,000.

Rockford, Ill.—Fall River Electric Gas Machine Company; capital, $50,000.

St. Louis, Mo.—Wagner Electric Manufacturing Company; capital, $25,000.

Fresno, Cal.—The Edison Electric Light and Power Company; capital, $100,000.

Denver, Colo.—The Kinsey-Wright Electric Elevator Company; capital, $25,000.

Grand Haven, Mich.—Grand Haven Electric Light and Power Co.; capital, $50,000.

Brighton, Colo.—The Brighton Water and Electric Light Company; capital, $20,000.

Jersey City, N. J.—The Pneumatic and Electric Tool Company; capital, $300,000.

Troy, N. Y.—Washington County Electric Light and Power Company; capital, $10,000.

Creal Springs, Ill.—The Electric Light, Street Railway and Power Company; capital, $6,000.

Lake Charles, La.—The Lake Charles Ice, Light and Water Works Company; capital, $100,000.

Williamsville, N. Y.—The Buffalo and Williamsville Electric Railway Company; capital, $50,000.

Mt. Vernon, O.—The Millersburg Electric Light Company, increase of capital stock from $15,000 to $25,000.

Butte, Mont.—Flint Creek Electric Power Company; capital, $25,000. Incorporators, T. F. Baker and J. H. Harper, of Butte, and A. J. Bennett, of Virginia City.

Natick, Mass.—Natick Electric Street Railway Company, to construct an electric railway, 6½ miles long, from Natick to Wellesley and Framingham, Mass.; capital, $60,000.

Chicago, Ill.—Oklahoma Water and Light Company, to operate water and gas works and electric light plants; capital, $300,000. Incorporators, Charles Wood, Horace S. Oakley, J. Gibson.

Minneapolis, Minn.—The "D. & D." Electric Manufacturing Company; capital, $50,000. Incorporators, Frederick G. James and Thomas Davis, of Minneapolis, and Gilbert Donaldson, of St. Paul.

The Bellaire Gas and Electric Light Company, of Bellaire, Ohio, is installing a 100 horse-power engine, built by the Ball Engine Company, of Erie, Pa.

The electric buoy-lights Nos. 2, 4 and 6, on the starboard side of Gedney's Channel, near Sandy Hook, which were recently discontinued to allow repairs to be made to the cables, were put in service again last week.

Mr. D. B. Dean, of the Electric Merchandise Company, Chicago, last week closed a contract with the Citizens' Traction Company, of Pittsburgh, for $10,000 worth of line supplies. A new continuous tubular steel pole will be used in this equipment.

ELECTRICAL REVIEW

Published at 13 Park Row,
P. O. Box 3329. NEW YORK.

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REGISTERED CABLE ADDRESS:
"ELECTVIEW," NEW YORK.
"1546 CORTLANDT." TELEPHONE CALL.

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One Year, Foreign Countries, - - 5.00
Single Copy, - - - - .10

ANNOUNCEMENT.

Address all communications and make all money orders and checks payable to order of ELECTRICAL REVIEW, P. O. Box 3329, New York.

No attention will be paid to communications for the REVIEW without the *name and address of the writer.*

NEW YORK, AUG. 29, 1891.

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Another link in the chain of submarine cables round the coast of Central and South America has been established by the completion of the system of the Société Française des Télégraphes Sous-Marins between the West Indies and Brazil. This places the United States and Brazil in closer telegraphic communication than they have been before.

The recent rain experiments, which are reported to be highly successful, producing from a clear sky a copious rainfall, extending over a territory covering 1,000 square miles, are strikingly suggestive of Franklin's familiar kite experiment. The rain-makers employed kites, to the tails of which were attached charges of dynamite, which were exploded when at a high elevation by electric currents sent along the kite strings or wires. Captive balloons containing oxygen and hydrogen in explosive proportions were also fired by electricity. These experiments are based on the historical fact that severe rain storms have always followed great battles where the cannonading was heavy and continuous.

The exportation of gold must have made times very hard in Clearfield, Penn. A local paper feelingly remarks:

"The electric light company and the water company are about the only firms in town that do a strictly cash business."

The electric light officials must be good business men to do a cash business in an "all credit" town.

The *Mail and Express*, an influential and highly successful afternoon daily of this city, celebrated the laying of the corner stone of its new building, Fulton street and Broadway, Wednesday of last week. There was a large attendance of distinguished people and the ceremonies were appropriate and interesting. Col. Elliott F. Shepard, the proprietor, is to be congratulated upon the successful commencement of this handsome and convenient new home for his ably edited, high-toned and progressive journal.

ABUSE OF THE WORD "ELECTRIC."

The National Editorial Association has pledged itself to run down the "substitute" evil. This is a robber's scheme which should deservedly die. The proprietor of Ephraim's Emollient for Easing Aches spends $500,000 in advertising his product. A customer enters a store where the Emollient is on sale and the clerk offers him something "just as good" at a lower price. Thus are the results of costly advertising diverted from the rightful recipient to a local dealer who probably doesn't spend $10 a year in printer's ink.

In much the same manner is the influence of the word "electric" perverted to base uses. To the uninitiated, the *hoi polloi*, this word carries a world of mysterious, subtle and powerful meaning. We see extensively advertised the merits of electric nostrums, electric hair-curlers, electric soap, electric tooth-brushes, electric knife sharpeners and hundreds of others. This is a swindling prostitution of a noble word to help the sale of articles not connected in any manner with anything electric. The cure for this lies in the education of the public in matters electrical, so that they may know of their own knowledge what to trust and what to avoid when they see or read about anything "electric."

Moral: Read the ELECTRICAL REVIEW.

THE THEATROPHONE IN PARIS.

A correspondent writes from Paris, under recent date, as follows: "I want to tell you about a machine they use here very much, but that I have not seen anything of in our country. They call it the theatrophone. It is virtually a phonograph that is placed in any hotel and connected with all the theatres. By dropping the familiar coin into the equally familiar slot, the thing is set in working order, and the conversation, music, etc., of whatever theatre it happens to be connected with at the time, is plainly heard by placing two receivers to the ears. They usually connect them with the opera, bouffés-Parisiens, etc., and with all the theatres that have music. When the curtain rises the machine receives its impression for thirty minutes, say, and is then switched off to another theatre. An indicator shows you what is going on at any time and you can choose what you wish. It is very ingenious; certainly more amusing than the weighing machines and pull-testers that so overcrowd our waiting-rooms everywhere.

"As a rule, the Frenchman seems to do things by halves. For instance, this city is provided with a very elaborate system of electrical clocks. All the out-of-door timepieces, together with most of the clocks in the hotels, are connected and run together. The other day something got out of order, all the clocks stopped, and for 12 hours time in Paris stood still, because they had no method of setting all the clocks and had to wait until the hour at which they stopped came around again. That is only one instance; there are many more."

In the matter of having a number of public electric clocks, New York should imitate Paris, but we would not have to wait 12 hours to correct the time, should anything get out of order.

NEW YORK AS AN ELECTRICAL CENTER.

There can be little doubt in the mind of any American or foreign electrical man that New York city is the real center of the electrical industries of this country. It is true that the largest electrical factories in the country are not located here, but that, of course, would be impossible, even if it were desirable, because the value of land is prohibitive to the establishment of works requiring extended space. The fact that several of the great electrical factories are situated at some distance from New York by no means disproves our assertion; the legs are the largest limbs of the human body, but they are the furthest away from the head which contains the brain, and the brain is the real center of the human body. New York is certainly the brain center of the American electrical industries. Many of the brightest men in the profession live and work in New York, and the new ideas which go the round of the world originate with workers, thinkers and inventors who make New York their headquarters.

This is true of almost any branch of the industry. If we turn to electric lighting we find that the first central station was started in New York city, and that New York central stations are models for the rest of the country to imitate. In electric motors New York has always led the way, and some of the best types of motors were designed in New York and are manufactured here today. So far New York has not done much in electric traction, but the pioneer work in that line was all directed from this city and carried out by New York men with New York money. In telephony the ostensible center is Boston, but every telephone man in the country knows that it is really at 18 Cortlandt street, and thither he wends his way when he needs aid in solving difficult problems or wants to know what improvements are being made. In telegraphy the same holds good, the improvements emanate from New York.

New York is the headquarters of the American Institute of Electrical Engineers, whose papers and discussions form an index of the steady growth in theoretical and practical knowledge of electrical science in America. The New York Electric Club is the first and most flourishing body of the kind in the country, and ranks among its members a large proportion of the most prominent men in the profession. The New York Electrical Society, in a less ambitious manner, does similar good work to that of the Institute, and the very fact that New York can support two such organizations, is an additional proof of the concentration of electrical thought and progress which it enjoys.

In New York are published the most prominent American electrical journals, and almost all of the original contributions to the literature of electricity in America either originate in New York or, at any rate, first see the light here. We have but lightly sketched the claims of New York to be the electrical center of the United States, and it would not be difficult to make out a far stronger case than that which we have set forth above, but probably most of our readers were already quite convinced that the Empire City's chief attraction for them lay in the fact of her being the heart and soul of the electrical industry.

We would direct the attention of American inventors to the timely words of Mr. Edwyn A. Brydges, a patent lawyer of Berlin, Germany. He declares that hundreds of American patents, some of them of great importance, have been cancelled in Germany, and the use of these American inventions made free to whoever cares to have them. This has been due to ignorance of the requirements of the German patent law on the part of Americans. Paragraph 11 of the Imperial German patent law of 1877 provides that a "patent can be withdrawn after the lapse of three years: 1. If the patentee neglects to work his invention in the country. 2. When it appears conducive to the public interest that permission to use the invention be granted to others, and the patentee refuses to grant such permission for an adequate compensation and on good security."

Many Americans have paid no attention to this paragraph. They have failed either to work their patent in Germany or to dispose of the right of manufacture to some German house within the three years' legal limit. Another cause for the forfeiture of many American patents in Germany has been the failure to pay the taxes due.

CORRESPONDENCE.

OUR CHICAGO LETTER.

Mr. W. T. Joyce, of the Lyons Sreet Railway Company, Lyons, Iowa, was a recent visitor in Chicago.

Mr. C. A. Benton, manager of the railway department of the Detroit Electrical Works, was a visitor in Chicago this week.

Mr. Geo. S. Searing, Western representative of the National Electric Company, has just returned from a six weeks' visit in the East, business and pleasure combined. Mr. Searing, with his family, spent about four weeks in the Catskills.

W. S. Bleckert and Company, successors to Bleckert & Nelson, electroliers and gas fixtures, 16 Franklin street, Chicago, have made an assignment. Mr. L. V. Becker has been appointed assignee. Assets are $4,000; liabilities, $3,000.

The Days are getting shorter and lamps are more and more in demand, sales larger and more frequent. This is the experience of Hood, at 239 La Salle street. He thinks it is because the "Jewel" lamp is so well liked by all who have tried it.

The officers of the Patton Motor Manufacturing Company have been besieged with communications concerning their new system of electric propulsion of street cars, and Secretary Bird is a busy man, indeed, trying to satisfy the inquisitive ones. The company have already secured the equipping of three lines.

Mr. D. M. Clower, of the firm of Clower, Harves and Company, of Dallas, Texas, was a visitor in Chicago this week and called at this office. Mr. Clower's concern is considered one of the largest electrical supply houses west of the Mississippi River. They also do a large contracting and electrical engineering business.

The much-talked-of ball game between the Okonite Base Ball Club, composed of employés of the Central Electric Company, and the Kerite Club, made up of the pick of the Western Electric Company, of this city, was played at Lincoln Park, Chicago, on the 15th inst., and resulted in a victory for the Okonites by a score of 11 to 7. The feature of the game was the invincible battery of Messrs. Cushing and Stacey. The Kerites played a very brilliant game, but did not seem to be able to get onto the tough curves and high tension pitching of the Okonites.

Before Leaving Chicago for the New York office of the New York Interior Conduit and Insulation Company, Mr. H. M. Underwood, late Western manager, planned, and had completed in every particular, a model two-story house in the rooms of the Institute of Chicago, showing in every detail their celebrated system, conduits for both concealed and exterior wiring; every portion of the work is excellently done, wiring being complete, electroliers and brackets all being fitted with incandescent lamps, making one of the most attractive exhibits in the Institute. The Electrical Engineering Company, 320 Dearborn street, are the Western agents for the company. They are at present doing some very large wiring contracts, using Interior conduit exclusively. L. W. C.

Chicago, August 22.

OUR CINCINNATI LETTER.

The Jones' Bros. Electric Company report an increase in their business, of both repairs and the furnishing of light and power.

The Cincinnati Street Railway Company are working hard on their new additions of electric road, and will have the Eden Park division running by the first of September.

Mr. P. B. Chaney, late of the Thomson-Houston Electric Company, has connected himself with the Revere Hard Rubber Company in the capacity of traveling salesman.

The Western Electric Company are making some changes and additions in the entrance and theatre of Pike's Opera House. The entrance will be one of the finest in the city, nothing but incandescent lights and mirrors.

Mr. Campbell Scott, agent of the Edison General Electric Company, is fitting up his place of business on Fourth street and will carry a large supply of the Edison Company's material. He reports business very good and on the increase every week.

The Edison General Electric Company have almost finished the wiring of the Sorg Opera House at Middletown, Ohio. This is one of the finest and best equipped houses in the State. The Cincinnati Gas Fixture Company have the contract for furnishing the fixtures. The fixtures are all very fine and were specially designed.

Cincinnati has at last an electrical union, which was organized a few months ago. It consists of some of the best workmen of Cincinnati and vicinity. It includes all men employed in electric light, railway or telephone and telegraph pursuits. They are organized under the Amalgamated Council of Building Trades. E. S. M.

Cincinnati, August 17.

OUR ALBANY LETTER.

There is talk of an electric road from Lockport, N. Y., to Olcott.

A new electrical supply store has been opened by Mr. Paul G. Burton, at No. 464 Broadway.

An Electric Plant has been placed in the Commereial Knitting Mill at Kingston, N. Y. Its capacity is 300 Fairbanks lights. The mill is running night and day.

The Troy and Lansingburgh Electric Railroad, of Troy, N. Y., has received all the material for its new power house at Division street. The furnaces will soon be lighted for a trial of the works.

The Hudson River Telephone Company, at Albany, is rapidly encompassing the task of placing the conduits for putting its wires underground. Large bodies of workmen are busy in tearing up the pavements and placing pipe along Pearl street.

The Electric Light Company at Cortland, N. Y., has closed a contract with the Edison Manufacturing Company for a 50 light 2,000 candle-power arc machine to be delivered immediately. This will double the company's present capacity for furnishing light.

Mr. Frank W. Sabold, manager of the Western Union Telegraph Company's Albany office, has resigned to accept a responsible position with the Westchester Telephone Company, whose principal office is at Yonkers, N. Y.. He leaves a host of friends here.

At the Secretary of State's Office there has been filed a certificate of incorporation of the Cambridge Electric Light Company. The capital stock is $7,000. Its objects are to furnish electricity for light, heat and power in the towns of White Creek, Cambridge and Jackson. L. M. W.

Albany, August 22.

OUR BOSTON LETTER.

Mr. Fred. Smith, of Salem, Mass., has been appointed manager of the Salem Electric Light Company. Mr. Smith has creditably filled important positions in the employ of the New England Telephone and Telegraph Company.

Manager James R. Magee, of the Thomson-Houston Electric Company's isolated lighting department, said to-day: "The number of orders for isolated electric light plants received at my office during the past three weeks exceed those received during June and July."

Mr. William G. Bergan, traveling representative of the Trenton Rubber Company, Trenton, N. J., was in this city several days this week looking after the interests of his company. Mr. Bergen's company manufactures superior qualities of rubber goods for electrical and mechanical purposes.

Proposed New Cable.—It is reported that the proposed—and much talked of—cable between Canada and the West India Islands is certain to be laid and put into operation as soon as practicable. This cable, when completed, will start at Halifax, N. S., and terminate at Demerara, British Guiana, touching the Bermudas, Fortune Island and the island of Jamaica.

The Rim & Falls Friction Clutch Pulleys, manufactured by the Falls Rivet and Machine Company for the Akron Iron Company, of Akron, Ohio, has become very popular among the electric light station people of New England. Mr. H. H. Abbott, of this city, manager of the Eastern department of the last named company, has fitted up several electric light stations recently with the clutches mentioned, together with other power transmitting machinery.

General Manager Howard, of the Tropical American Telephone Company, informs me that Demerara, British Guiana, has the cheapest telephone system in the world. Business houses are charged $24 per year and private dwellings $12. The Trinidad Exchange also charges reasonable rates—$48 per year to business houses and $36 to residential houses. The service is operated by a local company and has 376 subscribers.

Messrs. Claflin & Kimball, of this city, New England agents of the Mather Electric Company, have contracts with the following named manufacturers for the installation of electric lights in their respective factories, viz.: The Pairpoint Manufacturing Company, New Bedford, Mass., 1,000 (Mather) incandescent lights; Mount Washington Glass Company, New Bedford, Mass., 500 (Mather) incandescent lights; Southworth Manufacturing Company, Mettineague, Mass., 100 (Mather) incandescent lights, and The Fletcher-Webster Company, Nashua, N. H., 75 (Mather) incandescent lights. The firm named has just been awarded the contract to wire and equip, for incandescent electric lighting, the new building of the *Youths' Companion* Publishing Company. It is estimated that at least 3,000 Mather incandescent lights will be used to illuminate the building named. Messrs. Claflin & Kimball are also agents for the popular Perkins incandescent lamp and Perkins electric switches. W. I. B.

Boston, August 22.

OUR LONDON LETTER.

Berlin.—From the *Elektrotechnische Zeitschrift*, great progress has lately been made with the electric light in Berlin. At the end of 1890, there were 4,944 arc lamps and 80,788 incandescent lamps in use, while at the end of 1889 the figures were 3,778 arc and 62,876 incandescent lamps, being an increase during the year 1890 of 1,166 arc and 17,712 incandescent lamps.

The City and South London Electric Railway.—As the parliamentary powers have already been obtained for the extension from Stockwell to Clapham, arrangements are now being made for considerably extending the generating plant at the Stockwell station. An order for a fourth generating dynamo, similar to the three now working the line, has been given to Messrs. Mather & Platt, and will be of their patent Edison-Hopkinson type, for an output of about 400 horse-power. A fourth engine has also been ordered from Messrs. John Fowler & Company, similar to the three at present in use, and there is also to be a large increase in the rolling stock.

Messrs. Woodhouse & Rawson United, Limited.—This firm have a very interesting exhibit at the Royal Naval Exhibition, at Chelsea. There are models of several launches now being constructed at the company's new launch works at Kew. As showing the ease with which electricity can be used for launch propulsion, a working model has been constructed by the manager of the boat-building department in which the screw is attached directly to the axle of the armature of the motor. There are also a number of lamp-holders and lanterns for affixing to partitions and attaching to ceilings in fitting up installations on board ship. There is also on view a six-way distributing switchboard and a number of Cunynghame, Woodhouse and Rawson's magnetic cut-outs.

London, August 12. CHAS. FRENCH.

Portraits of Electrical Men.

On the first three pages of this issue our readers will notice the portraits of three gentlemen who have been prominently identified with the preparations for the Montreal Convention of the National Electric Light Association.

President Chas. R. Huntley is the youngest man ever elected to this honorable position. A native of New York State, he has always been recognized in business life as a progressive and forceful man, and when he entered the electric lighting business at Buffalo, in 1888, at once took a prominent position in electrical circles. He served most acceptably as Chairman of the Executive Committee of the Electric Light Association, and at the Providence meeting, six months ago, was elected president without opposition. Mr. Huntley is very popular, courteous in his manner to every one, and has labored earnestly for the success of the Association as a whole. The Montreal meeting, under his energetic management, promises to mark a valuable milestone in the advancement of the interests of electric lighting.

Mr. Albert J. Corriveau, president and general manager of the Canadian Electrical Construction, Manufacturing and Supply Company, of Montreal, was formerly connected with the great silk house of Givernaud Brothers, of New York. Mr. Corriveau, inspired by patriotic motives, was the pioneer in establishing the silk industry in Canada; after this he was for three years general agent for the Royal Electric Company, of Montreal, leaving that firm to organize the company of which he is now president. Mr. Corriveau has been a member of the National Electric Light Association for some years and by his energetic efforts he succeeded in having the present convention held in his city. His assistance and wide acquaintance in Montreal have been of the utmost value to the various officials in the preparatory work of the convention.

Prof. Henry T. Bovey, chairman of the Citizens' Committee, is a prominent Canadian educationalist. He is a native of Devonshire, England, and a graduate of several English schools and universities. He is an engineer of well-known ability and has been professor of civil engineering at McGill University, Montreal, since 1878. The year following his appointment as professor his department was made a separate faculty, and Professor Bovey was made dean, a position he still holds. One department under Professor Bovey is devoted to the study of electricity, a science with which he is intimately acquainted. Professor Bovey is a member of a large number of engineering societies. The Association was fortunate in securing his valuable aid.

The Washington Meeting of the American Association for the Advancement of Science.

A NEW THEORY OF TERRESTRIAL MAGNETISM.

The yearly meeting of the American Association for the Advancement of Science, held last week, in Washington, D. C., was not as successful as was expected for the Capital of the United States. While in former years, such as the Philadelphia meeting, the number of members in attendance and registered was more than 1,200, and in Montreal over 1,000, there were in Washington only about half that number. The newly elected members were, however, as numerous, as usual, namely between 300 and 400, while the number of papers entered to be read was below the usual average, about 200 in all. A great convenience was that all the sections could meet in the same building, the Columbia University, the same as was the case last year in Indianapolis, where the magnificent State Capitol had been placed at the disposal of the association, while in New York, the use of Columbia College was granted for the meetings. In Philadelphia, however, the different sections had to meet in separate buildings found in different localities of the city.

The principal disappointment was that during the hot term the leading inhabitants of Washington always leave the city for the mountains or seashore, so that there were no receptions nor social gatherings, except on the White House grounds, where the President, notwithstanding he was absent, had the members invited, while the Marine Band gave a very mediocre execution of some very good musical compositions.

There were exceptionally few papers read and discussed on electrical subjects. They were: "Notes on Magnetic Measurements," also on "Rotating Contact Methods of Measurement of Variable Electric Magnitudes," by B. F. Thomas; "The Periodicals of the Aurora," by M. A. Veeder; "Some Experiments on Atmospheric Electricity," by A. McAdie; "Theory of the Cause of the Variation of the Compass Needle," by Professor Bigelow.

The last paper deserves special notice by reason of the originality of the writer's theory. He holds that "the sun is the exciting cause of a colossal magnetic field, in which the planets revolve like armatures of a dynamo. That the rays of force by a sort of magnetic refraction enter the dark side of the earth in peculiar curves, pass through it in straight lines, and emerge in similar curves on the sunny side of the earth, and so turn all the compass needles in a corresponding way."

It is a strange mental phenomenon that some people seem to be satisfied with verbose sentences, expressed in words, which have no definite meaning, such as "rays of force," "peculiar curves," etc., which convey to the intellect no clear conception whatsoever. It is especially remarkable that such an out of the way complex hypothesis is brought forward as an attempt to explain a phenomenon which is explained in a most simple manner by applying the discovery made by Oersted, in 1819, that the compass needle places itself at right angles to electric currents, which pass through the earth's crust from east to west, parallel to the equator, and of which as well the local as the constant and variable deviations from the correct east and west course fully explain the declination and variation as well as the inclination of the compass needle.

It has been proved that the magnetic action of the earth extends to a comparatively small depth in the earth's crust, while the large interior mass is at so high a temperature that all magnetic action ceases there, so that no "rays of magnetic force" pass through the earth in straight lines. P. H. V.

Go to Montreal September 7.

After a lethargic Summer, a lively Fall business in electrical circles is assured. In electric lighting and power and mining circles particular interest is being manifested.

Telephonic News

⁂ The Pennsylvania Telephone Company has paid a quarterly dividend of one per cent.

⁂ The Southern Massachusetts Telephone Company has declared a quarterly dividend of $2 a share.

⁂ Stockholders in the New England Telephone Company have received a dividend of 75 cents per share.

⁂ A storm at Quincy, Mass., last week, crippled the telephone service. About 75 instruments were rendered useless.

⁂ The New England Telephone and Telegraph Company is to expend $2,000 in bettering the service at Newburyport, Mass.

⁂ The Erie Telegraph and Telephone Company, of New York, has filed a certificate announcing the increase in the number of its directors from 11 to 21.

⁂ At a hearing in New York, July 29, in the suit of the Tropical American Telephone Companies *vs.* the Western Electric Company, *et al.*, for infringement of the "Hynes" drop patent, the judge refused to discuss the bill on the ground of no service of the writ in New York, and the case will now go to trial.

⁂ The account given in the local columns of the visit of depredation committed by two gypsy women upon a Sixth street house, suggests that the telephone is really the greatest protection which a woman can have in her house. A minute suffices to call the police, and five or 10 minutes to bring relief or protection.—*Oakland, Cal., Enquirer.*

⁂ The condition of the Tropical American Telephone Company, on July 1, was as follows:

ASSETS.	
Bills receivable	$25,209
Merchandise on hand	24,000
Treasury stock, 1,150 shares	863
Cash	5,372
Total	$55,444
LIABILITIES.	
Bills payable	$8,580
Balance	46,864
Total	$55,444

⁂ The Mexican Telephone Company has vested its power of attorney in Senor Pablo Martinez del Rio, an eminent lawyer of Mexico City. He is its highest representative in Mexico. The company has recently signed a contract with Mr. J. E. Torbert, of Charleston, S. C., making him the general manager of the company, succeeding the late D. J. Hobert. Mr. H. M. Moran, who has been cashier of the Mexico office for a number of years, has been made chief accountant.

⁂ A system of long distance telephones has been added to the conveniences of the Thomson-Houston factory at Lynn, Mass. Three wires will run to the Lynn central office, one to Boston and five about the factory. An additional switchboard has been put into the "central" on the first floor of the office building, and one operator will care for both that and the regular factory exchange. Eighteen wires enter the new switchboard. The arrangements are very complete with the new system, for each of the factory telephones can now be connected with the outside lines.

Electricity is Life—Electricity is Death!

[From the *Morning Advertiser.*]

In the current number of the *North American Review*, noting the alleged stimulative effect of electricity in promoting the growth of plants, Mr. Edward P. Jackson is moved to ask if electricity "may not be an actual creator of life?" The advocates of the new method of capital punishment in this State are under the impression that electricity is the most effective agent in the exactly opposite direction.

New Telephone Building at Kansas City.

The Missouri and Kansas Telephone Company, of Kansas City, Mo., has recently purchased a new building for its general offices, a view of which is presented herewith. The telephone exchange will probably be moved into the new quarters early next year; at present the general officers occupy the building, the exchange remaining in the old building, at the corner of Sixth and Delaware streets. The new building is a very handsome structure, located on the corner of Sixth and Wyandotte streets, and is in every way a very desirable place for telephone headquarters.

It is very likely that the approaches to the new telephone exchange will be by underground conduits, which will bring down the many cables and wires which, as shown, now pass in front. The officers of the Missouri and Kansas Company are: John R. Mulvane, president; W. W. Smith, secretary, and N. R. Furguson, treasurer.

PERSONAL.

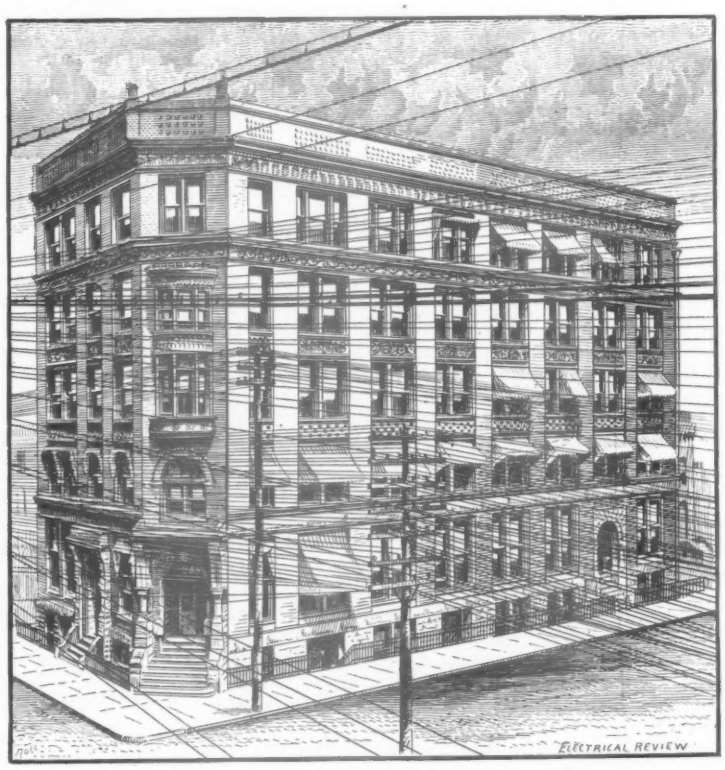
Prof. John P. Barrett, electrician-in-chief of the World's Fair, was a New York visitor last week.

Mr. Samuel Insull, second vice-president of the Edison General Electric Company, was one of the guests at ex-Senator Arkell's birthday banquet to President Harrison at Mt. McGregor last week.

Capt. W. L. Candee and wife returned on Saturday last from a very enjoyable two months' sojourn in Europe. They were met down the bay by the members of Company B and officers of the Twenty-third Regiment, and taken off the ship and brought in on the ocean tug chartered for the occasion.

President W. H. McKinlock, of the Central Electric Company, Chicago, and Mr. J. J. Nate, purchasing agent of the Chicago Telephone Company, were eastern visitors last week, enjoying a brief respite from business cares. Their friends in the metropolis were glad to see these active representatives of progressive Chicago.

Mr. James I. Ayer, the handsome general manager of the Municipal Electric Light and Power Company, of St. Louis, visited New York last week. This company's plant, which has been fully illustrated and described in the ELECTRICAL REVIEW, has grown rapidly under Mr. Ayer's able management, until now it supplies its customers with 3,400 Wood arc lights on 1,200 miles of circuit, and 2,000 Heisler incandescent lights. Preparations are being made to add 20,000 incandescent lights of the Slattery induction system.



NEW TELEPHONE BUILDING AT KANSAS CITY, MO.

Knights of the Key.

OLD-TIME AND MILITARY TELEGRAPHERS HOLD THEIR ANNUAL MEETING AT WASHINGTON.

The beautiful city of Washington, where so much history has been made, and which is world famous as the place from which Morse sent the first telegraph message, was last week the scene of a reunion which must have caused a patriotic thrill to tingle to the finger tips of every one who witnessed it. The Old-Time Telegraphers' Association and the Association of Military Telegraphers made that city a rendezvous and many an old acquaintance was revived and strengthened as a result. The old timers admit to their membership only those who have handled the telegraph key for at least 20 years, and as the military telegraphers include only those who were on duty in connection with the military telegraph during the war, the members of that association, too, are veterans in the service.

The Royal Blue train, over the Baltimore & Ohio Railroad, ran in two sections on Tuesday morning, the 18th, and carried two trains full of old-timers from New York. Among the party were the following: W. J. Dealy, general manager of the Western Union operating rooms and superintendent of its cables in New York. He was a pioneer in the army service on the Union side. He was in the field at the first battle of Bull Run, and it was his hand which sent the first message to Washington that announced the first defeat of the Union troops, and carried consternation and terror throughout the North.

Another veteran member of the party was John H. Dwight, night manager of the Western Union office, at New York. He enlisted as a private in Berdan's Sharpshooters, from Hudson, Mich., in 1861. He served for about six months in its ranks and then was called to the important post of private cipher operator to the Secretary of War. Under his fingers the key flashed the first news over the country that Lincoln had been assassinated, and the subsequent official dispatches sent out by the War Department relating to Booth's crime came from his desk.

With Mr. Dwight was "Senator" W. S. Ives, another veteran of the corps, who was stationed at Alexandria, Va., all through the rebellion and handled many of the important messages which passed between the government and the seat of war.

Tom Dolan, assistant night manager of the Western Union office, was another member of the famous corps who did active duty in keeping up the communication between the Army of the Potomac and the troops in the West. He was at Appomattox, and was one of the operators who sent out the news of Lee's surrender.

Other military operators and old-timers who made up the party were Joseph Knittle, John Brant, T. B. Fulton, Thomas Drill, T. P. Scully, H. A. Moody, J. A. Regan, J. L. Edwards, J. B. Taltavall, Rupert G. Stephenson, S. J. Gifford, of Dunkirk, N. Y.; A. L. Eugene, of Bridgeport, Conn.; Walter Phillips, A. Weller, J. H. Emerick, superintendent Postal Telegraph Company; D. C. Sullivan, M. H. Kerner, J. F. Shorey, F. H. Duncan, W. J. Stanton, J. H. Bunnell, E. C. Cockey, M. R. Hults, John Rathbone and L. S. Jones.

All day Tuesday the delegates kept coming to Washington, and on Wednesday morning, when the first session was held, between 100 and 150 members of the two associations from all parts of the country had arrived.

The meetings were held in the red parlor of the Ebbitt House, and the first one on Wednesday morning was called to order by President George C. Maynard. The address of President Maynard was an interesting review of the development of the telegraphic system. It was fitting, he thought, that this association should meet in Washington, the city where the telegraph had its beginning, a city filled with the memories of such men as Morse, Henry, Vail and Kendall.

Speaking of men who had worked their way to positions of distinction, he referred to Carnegie, Bullock, Green, Edison, Davis, Wickam, Reed and George Kennan, "the man who was disciplined in the telegraph to become one of the world's heroes." Mr. Maynard also paid high tribute to the women of the profession, and to the great value of the services of Anna Ellsworth. Among the deceased members he recounted the work of David Brooks, Col. T. M. Dayton, Thomas Finnegan, and others. Passing to the growth of the system, he drew a comparison between 50 years ago, when one little line led its solitary way out of Washington, and the present, when the wires "encircle the world and encompass humanity."

At the conclusion of the address a vote of thanks was tendered the president.

The first business transacted was the election of new members, the following being added to the roll: Thomas D. Lookwood, Boston; P. J. McKeever, Pittsburgh; James D. Hoge, Zanesville, Ohio; W. M. Ash, G. L. Diven, Jesse M. Sarvis, W. H. Clarke, J. B. Austin, J. A. Hutchinson, J. D. Thurston, C. M. Heaton, Sr., and C. M. Heaton, Jr., Washington, D. C.; Ralph W. Pope, New York; C. F. Vanderford, Knoxville, Tenn.; J. J. Clark, Sandy Spring, Md.; F. G. Waddell, Columbus, Ohio, and R. J. Bloxham, Baltimore.

Mr. C. M. Heaton, Sr., had the honor of being elected by acclamation. He is 87 years of age, and began the work of telegraphing in 1848. As a souvenir of his early work he exhibited the instrument he used when he began.

President Maynard reported what had been done in the way of collecting information concerning the old time operators, and outlined the work. He also suggested that the members have their portraits taken and that all relics of the old days obtainable be secured and collected for the National Museum.

A number of letters were read from absent members, among them one from George E. Gilliland, of the Cincinnati *Enquirer*. It had been the intention of the *Enquirer* to present each member with a souvenir silver piece. The die for the work had been made, but at the last moment an accident occurred, and the work could not be completed. While regretting the accident, John R. McLean sent his check for $50 instead, to be used by the committee toward defraying the expenses of the meeting. The communication was received with applause. President Maynard was appointed chairman of the committee to collect relics.

At the afternoon session the association decided to meet in Omaha, Neb., the third Wednesday in August of 1892, with the military corps. Edward Rosewater, of Omaha, was elected president: George M. Dugan, vice-president, and Manager W. J. Dealy, of the Western Union New York office, secretary and treasurer.

Wednesday evening and Thursday were spent in sightseeing.

Thursday evening a reception was held at the armory of the National Rifles. Circuits had been run into the armory and arranged so that messages from all parts of the country could be received from those unable to attend.

One of the messages received was this:

"To the Old-Timers the operators in the land of the Montezumas send warmest greeting. *Buenos Nuces!*"

The circuit was then changed at the general office, and every moment or two messages of congratulation were taken from the wire. Among them were warm words from Gen. Thomas T. Eckert, A. B. Chandler and James Merrihew, all of New York. Greetings came also from Augusta, New Orleans, Atlanta, Pittsburgh, Chicago, Cincinnati, New York, El Paso, Los Angeles, Philadelphia, St. Paul, Omaha, Buffalo, San Francisco, Ogden, Portland and numerous other cities. Congratulatory messages and the announcements made upon the stage were sent back.

During the evening an intermission was had between speeches, and the telegraphers and their friends repaired to the lower rooms of the armory, where an elaborate luncheon was served.

President Maynard, of the old-timers, presided at the meeting and introduced each speaker in a few very appropriate remarks. The first one was Mr. M. M. Parker, president of the Board of Trade, who paid a glowing tribute to the incalculable advantage of the telegraph and the work of the men who operated that great system which, "if stopped for a day, would paralyze business, and if for a week would bankrupt the universe."

This speech was followed by a highly interesting address by Mr. W. W. Burhaus, of the United Press Association, on the history of the development of the telegraph business, with the original line between Washington and Baltimore as an illustration.

Assistant Secretary of the Treasury Netleton followed in a good speech, in which he welcomed the men to Washington on behalf of the Treasury Department, and brought out the fact that the first line was under the control and direction of the Treasury Department.

Colonel Whitfield, representing the Post Office Department, made an interesting speech.

Assistant Secretary Willits was introduced as a man who had been in the telegraph business six weeks, an infant in the profession. This presentation of the secretary started him on a humorous strain, in which he discussed "infants and infants."

In a fitting speech, President W. R. Plum, of the Military Telegrapher's Corps, introduced Assistant Secretary of War Grant. His remarks were eulogistic of the work of the "boys," as he called them, during the war, and the secretary called forth loud applause when he said there was but little difference between the telegraph line, the line of duty, and the line of battle. During the war it was generally a race between the operator and the army, and the operator was generally ahead.

"I think," said Secretary Grant, "these boys should be recognized as soldiers, and recognized by this government." As he concluded, the secretary paid a tribute to the work of the profession generally and the usefulness of the "mysterious click, click, as mysterious as old Nick."

Prof. J. E. Watkins, of the Smithsonian, delivered an address upon the advisability of making a collection of old-time relics. Mr. H. B. McFarland, related his experience as a special correspondent in connection with the telegraph, and this was replied to in a paper written by a prominent operator under the *alias*, "A. G. Johnson," who pictured the trials of the operator in deciphering miserable "press copy."

Short speeches were also made by R. B. Lewis, O. S. Safford, A. H. Bliss, John E. O'Brien, and other members of the association. A paper was read from J. D. Reid, one of Morse's early associates, who is now United States Consul at Dumferline, Scotland. It was almost midnight when the circuit was cut off and the telegraphers left the armory.

Friday the members went to Mount Vernon, where the tomb of Washington was visited and where a photograph of the group was made.

The Postal Telegraph.

Interesting accounts have been received at the post office department from Henry George, Jr., a newspaper correspondent now supplying a syndicate of American daily newspapers with letters from England touching the postal telegraph system in that country. He says the charge for telegrams to all parts of the United Kingdom is one cent a word, including the address, the minimum charge being 12 cents for 12 words or less. Ordinary postage stamps are affixed to the messages in payment. A moderate additional charge is made when the addressee lives beyond the limits of the free delivery. Telegrams can be repeated at half the original cost. The cost of a reply not exceeding 48 words may be prepaid, and a "reply form" is then delivered to the addressee, who can send his reply from any telegraph office within two months. Five figures are counted as one word; in this country the telegraph companies count every figure a word. As a measure of economy, where many messages are likely to be sent, an abbreviated or arbitrary address may be registered for five dollars a year. In addition to these direct benefits, the people enjoy very

FIG. 1.—PADDOCK ARC LAMP HANGER.

substantial indirect advantages such as result from a cheaper service for newspapers and news agencies.

The rate for news messages to all parts of the Kingdom is 24 cents for every 100 words transmitted between 6 P. M. and 9 A. M., and during the day it is 24 cents for every 75 words, with the additional charge of four cents per 100 or 75 words, according to the hour, for every duplicate telegraphic communication. A correspondent in London with 300 papers on his list, for instance, pays for sending out a piece of news after 6 P. M. at an average rate of a fraction over four cents per 100 words. In this way, Mr. George says, the vast bulk of news telegraphing is done.

The Delany multiplex is one of a number of American inventions in use in England by which it is possible to send out six messages over a single wire at one time. The British government pays $10,000 a year royalty on it. It has been in profitable use there five years. A prodigious amount of work, in an incredibly short time, is accomplished in the English Postal Telegraph system by the Wheatstone automatic process. This is an English invention, transmitting 400 words a minute, and is used in newspaper telegraphic work.

Since the government regulation of the telegraph lines in England, the number of telegraph offices has been increased from 2,488 to 7,600, the rates have been reduced more than one-half, and press rates cut down to a fraction over four cents per 100 words; and, more important than all that, the service has been equally and impartially cheap to all. Universal sentiment, according to Mr. George, testifies to the immensely greater convenience and efficiency of the postal telegraph system, and no one would ever think of going back to the old plan of private companies. Mr. George thinks that as good, if not a better, postal telegraph system could be established in the United States. The American letter service is really much cheaper than the English, taking into account the fact that our territory is 30 times larger, and electrical invention, instead of being checked, would be stimulated.

Another Large Telescope.

Visitors to the Royal Observatory, Greenwich, will hereafter miss the great cylindrical structure which has for a quarter of a century and more covered the largest telescope possessed by the Observatory. Notwithstanding its size, we learn that the Astronomer Royal has now procured, through the Lords Commissioners of the Admiralty, a telescope more than twice as large as the old one. This step, long delayed at Greenwich, was absolutely required in the recent advances of astronomical science; and the optical peculiarities which the Astronomer Royal has embodied in the new instrument will render it one of the three most powerful telescopes at present in existence. The glass itself has a diameter of 28 inches, and is figured by Sir Howard Grubb to a focal length of 28 feet. This relatively short distance of the focal plane specially adapts the objective to photographic requirements.

In view of the advantage resulting from the use of electric lighting for the photographic, equatorial and other instruments, it is very desirable that an electric light installation should be provided for the observatory, says the *Evening Post*, of this city. This method of lighting is especially adapted to the requirements of an observatory, and might then be applied to the instruments generally, as has been done with marked success at the Royal Observatory, Cape Town, the Leipzig Observatory and elsewhere. The new 13-inch photographic refractor has been brought into working shape, and is found to be very satisfactory and admirably adapted to its purpose. In particular, as its electrically controlled driving-clock proves to be very efficient, the great work of photographic star-charting to which the instrument is to be applied, will be thoroughly well done.

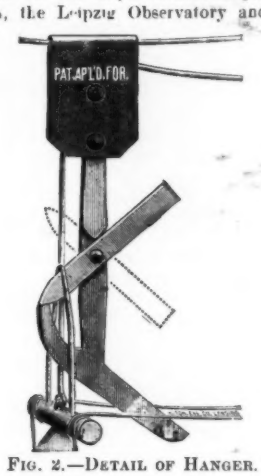


FIG. 2.—DETAIL OF HANGER.

The Paddock Safety Arc Lamp Hanger.

The Central Electric Company, Chicago, have just put upon the market the Paddock safety arc lamp hanger shown in the annexed illustrations.

It will be noticed that its construction is of the simplest character, rendering a detailed description unnecessary.

The hanger guarantees absolute safety from falling lamps and all attendant dangers and expenses by reason of insecure fastening or the breaking of ropes. Combined with the hanger is a sleet-proof pulley, which is always indispensable in this sort of device. The hanger is being placed upon the market at an extremely low price, and is especially recommended to companies who have tried expensive devices of this kind that have proven failures.

The Vincennes, Ind., Citizens' Street Railway Company have just finished roofing their electric power house and will have their road in operation very shortly.

TELEGRAPHIC

.... The Pittsburgh Printing Telegraph Company has completed a line between Pittsburgh and Punxsutawney, Pa.

.... The Chinese government expedition to lay telegraph lines has been expelled by the people in Yunnan, losing all its apparatus and materials.

.... The Postal Telegraph Company has established a line by which direct communication can be had between Annapolis, Md., and Philadelphia.

.... The Johnson Railroad Signal Company has secured the contract for equipping the New York Central tunnel with their electric block signals. The work will cost $20,000.

.... Work has been begun upon another telegraph line to penetrate the Adirondacks. A line will be established between Lake Meacham and Malone, N. Y., and it is expected to be finished and in operation by the first of September.

.... The Mt. Holly Paper Company is building a telegraph line from that place to Carlisle, Pa., to connect with the Western Union at the latter place. The distance is six miles, and the line will follow the Baltimore and Hanover turnpike.

.... The new telegraph line between Tatoosh Island and the mainland of California, which was built on the recommendation of Lieutenant John Finley, of the Weather Bureau, is about to be opened. This will extend the field of weather observations about 200 miles further north, and will probably be the means of opening two more stations, one at Neah Bay and the other at Port Angeles. Additional stations for storm signals will also be opened at Gray's Harbor and Clallam Bay.

Electricity in Mining.

Although it is but a few years, three or four at the most, since electricity was permanently introduced into the coal mines of this country, not only as light, but what is far more important, in so far as it is more generally applicable as a motive power, that great power, chained and made to do the will of man to a most wonderful degree, has become a dominant factor in furnishing the force to operate coal cutters, drills, underground haulage, pumps, to drive ventilating fans, and, in fact, everything connected with the thorough running of all the apparatus necessary for a well equipped mine, excepting the production of steam to drive the dynamos in case water power is not available. Many are the various devices in the form of mining machinery that have been launched forth on a successful career during the past three years. Electric mining machines are being placed in many coal mines with most satisfactory results. The Jeffrey Manufacturing Company, of Columbus, O., for instance, has recently equipped the following mines with their electric coal cutters: The Helvetia Mines, Helvetia, Pa., with four machines; the Redstone Coal and Coke Company, Grindstone, Pa., with two machines; the Union Colliery Company, Victoria, B. C., with four machines. The Michales Electric Mining Company is putting in an electric mining plant at O'Neil & Peterson's coal works at Bunola, on the Monongahela River. It will be in working order in a few days. In addition to the above, negotiations are now pending with a number of other large companies for the adoption of these excellent cutters. Judging from the report of Mr. Norwood, the State Mine Inspector of Kentucky, some of the largest coal companies in that State are contemplating the feasibility of adopting these machines, together with the haulage system, etc., in their mines.—*McKeesport, Pa., Times.*

* * The Worcester, Leicester and Spencer, Mass., Electric Railroad was formally opened August 18, as far as Leicester.

* * The storage battery cars from Beverly to Danvers, Mass., have been discontinued, and some other motive power will be substituted.

* * The Jamestown, N. Y., Electric Street Railway is to be extended from Lakewood, which point it has just reached, to Falconer, a clean stretch of eight miles, by September 15.

* * The Pottsville, Pa., Electric Railway has declared a three per cent. dividend, and will be opened to Tumbling Run very shortly. The road has been a paying venture from the start, and the stock is above par.

* * The St. Cloud, Minn., Street Railway Company has been granted a franchise giving them use of the streets of Sauk Rapids for 50 years, provided the two cities are connected by an electric line in three years.

* * The City Cable Company, of Denver, Colo., has abandoned its South Fourteenth street horse car line and the tramway company has started to grade for the electric line guaranteed by the Metropolitan Company, which has to be built by January 1.

* * The use of electric motors on the Montgomery Street Railway in Jersey City, N. J., has been temporarily abandoned because the Street and Water Board has refused to permit the extension of the electric line to the Pennsylvania Railroad ferry.

* * The Savannah, Ga., Electric Railway Company has executed a mortgage upon all its property to Henry H. Hull and Francis S. Lathrop, as trustees, for the payment of $125,000 worth of bonds. The bonds bear six per cent. interest annually, and are issued to pay off the indebtedness contracted in building and equipping the road.

* * Mr. C. C. Curtis, New York representative of the Short Electric Company, Cleveland, has secured a contract for equipping a portion of the Brooklyn & Coney Island Electric Railway with the new Short gearless motor, which has recently undergone such a successful trial at Cleveland. Within a few weeks this motor will be put to a severe test at Albany, N. Y.

* * The Burton Electric Company has just obtained an order for their electric heaters to be placed on all the cars of the Westminister & Vancouver, B. C., Railway. The cars are being fitted up with these heaters at the works of J. G. Brill & Company, Philadelphia, who were authorized to procure the best heating appliances manufactured for such purposes.

* * The following details have been obtained of the power plant to be erected by the Little Rock, Ark., Electric Street Railway Company: The main building is to be 285x98 feet and four stories high. There will be installed three Heine safety boilers of 250 horse-power each. In the engine room, on the same floor, are to be two Hamilton-Corliss engines of 300 and 500 horse-power, respectively. These are to be connected to the counter-shafting by two mammoth belts 52 inches in width. On the second floor will be placed five 100 horse-power Thomson-Houston dynamos and one 500-volt machine, to be driven by an Ide engine placed on the same floor. The switchboard at the end of this room is to be handsomely equipped with Thomson-Houston fittings. A large force of men are now engaged in line work for the new system, and it is expected that the plant will be in full operation this fall.

Woodhouse & Rawson Electric Launches.

Woodhouse & Rawson, United, Limited, of 88 Queen Victoria street, London, present a large collection of their well-known apparatus devoted to objects connected with naval warfare at the Naval Exhibition now open at Chelsea, England.

Their exhibit includes an electric winch, search-lights of all sizes, incandescent hand lamps, fixtures suitable for intallations on board ship, signaling bells, distributing boards, cut-outs and other safety devices.

Woodhouse & Rawson have just completed for the British government the electric launch illustrated in Fig. 1. It will be used for the conveyance of troops from one part of Chatham dockyard to another, and is also designed as an experimental vessel to determine the merits of electric power as applied to the propulsion of small vessels. At the company's works, near Kew, there are several launches in course of construction, among which is the "Golondrina," 53 feet long, which has been built for the Mexican government.

In Fig. 2 is illustrated the launch "Glowworm," which Woodhouse & Rawson have just completed for Mr. Pears. This launch will carry 40 passengers and travels at the rate of nine miles per hour.

The manager of the company's boat building department has constructed a working model in which the propeller is attached directly to the armature shaft of the motor. This has been done in order to demonstrate the adaptability of electric power to launch propulsion.

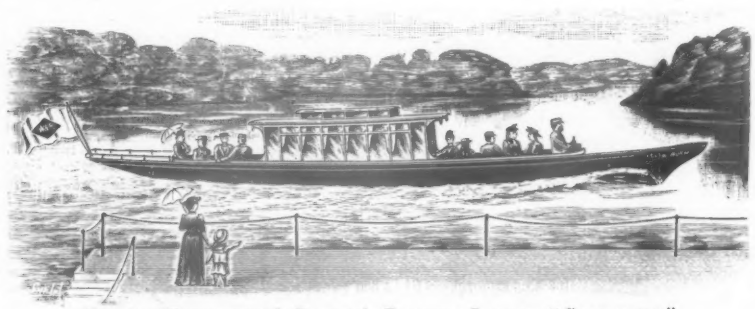


FIG. 2.—WOODHOUSE & RAWSON'S ELECTRIC LAUNCH "GLOWWORM."

NEW ELECTRICAL BOOKS.

[*The following new electrical books will be sent by the Book Department of the* ELECTRICAL REVIEW, *postage prepaid, on receipt of price.*]

A PRACTICAL TREATISE ON THE INCANDESCENT LAMP. By J. E. Randall. Pp. 82; illustrated. Price, 50 cents.

In this little book the auther sets down a popular running history of the incandescent lamp and its processes of manufacture. The electrical amateur and the laymen will find it of interest.

"THE ELECTRICIAN" PRIMERS. VOL. I—THEORY. VOL. II—PRACTICE. Pp. 126 and 283. Fully illustrated. Price, $1 each.

These books are helpful primers on electrical subjects, dealing with the present state of the art in simple and correct language. They are designed for the use of students and general readers. Each primer is short and complete in itself, and is devoted to the elucidation of some special point or the description of a special application. They are important additions to electrical literature.

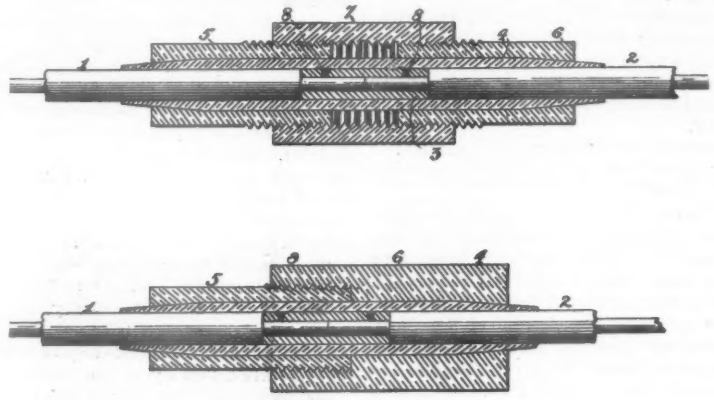
Coupling for Electric Conductors.

In the accompanying engraving is an electric joint for conductor, invented by George T. Manson, well known in electrical circles, of the International Okonite Company.

Nos. 1 and 2, in the upper figure, represent two conductors between which it is desired to establish an efficient moisture-proof joint. The ends of the conductors are bared for a short distance sufficient to make a snug fit between the adjoining portions of the insulating cover and a copper tube 3, which is used for establishing the connection. After baring the conductors, a soft-rubber sleeve 4 and the clamping-tubes 5, 6, 7, are slipped over the end of one of the conductors. The copper sleeve 3 is then placed over the bared ends and fastened by set-screws 8, or by means of a few drops of solder, thus establishing a reliable electric connection between the joined conductors. The elastic sleeve 4 is then shifted over the joint. This sleeve is made tapering at its ends and cooperates with two tubular clamps 5, 6, provided with tapering shoulders on the outer ends. The inner ends of these clamps are screw-threaded with right and left-handed threads, respectively, and co-operate with a nut 7, provided with internal threads, to draw the clamping tubes together. The nut and clamping tubes are both preferably made of insulating material—such as hard rubber—though they might be constructed of metal, inasmuch as they are perfectly insulated from the joint by means of a soft-rubber tube 4. The nut 7, and the tubes 5, 6, are provided with a polygonal contour, so that they may be readily manipulated by hand or by a wrench to draw the tubes together horizontally and tighten the elastic tube.

It will be readily understood that as the clamping tubes 5, 6, are drawn together their internal shoulders, co-operating with the inclined ends of the soft rubber tube, will firmly crowd the latter into close engagement with the insulating covering of the conductors, and by drawing them together with a hard pressure a thoroughly water tight connection is made and the joint will be securely protected.

In the lower figure a modification is shown in which the clamping tubes screw into one another, and the nut is dispensed with. These tubes will be given a polygonal contour at the ends similar to the tubes 5, 6, of Fig. 1, so that they may be screwed together. Otherwise the joint is established in the same manner as described in connection with Figs. 1 and 2. The copper sleeve is not absolutely essential to the establishment of the joint, as the two abutting ends of the conductor might be soldered together and wrapped with tape to fill out the space into alignment with the insulation of the conductors, thereby preventing the elastic tube from buckling when the clamping tubes are drawn together.



MANSON'S COUPLING.

Mr. Whipple and His Agent.

TO THE EDITOR OF ELECTRICAL REVIEW:

We notice in your issue of August 22, 1891, a statement from your Chicago office that G. G. McDuff, formerly in our employ, has brought suit, etc., for balance of salary amounting to $850. You could not have been informed correctly, else you would hardly have made such a statement. While we do not propose to try this case in the newspapers, we might say that Mr. McDuff has a disputed claim for alleged commissions and expenses. That is all.

Please give this as prominent a place in your next issue as the statement referred to.

Very truly yours,
THE FRED. H. WHIPPLE CO.,
Fred. H. Whipple, Pres't.
New York, August 22, 1891.

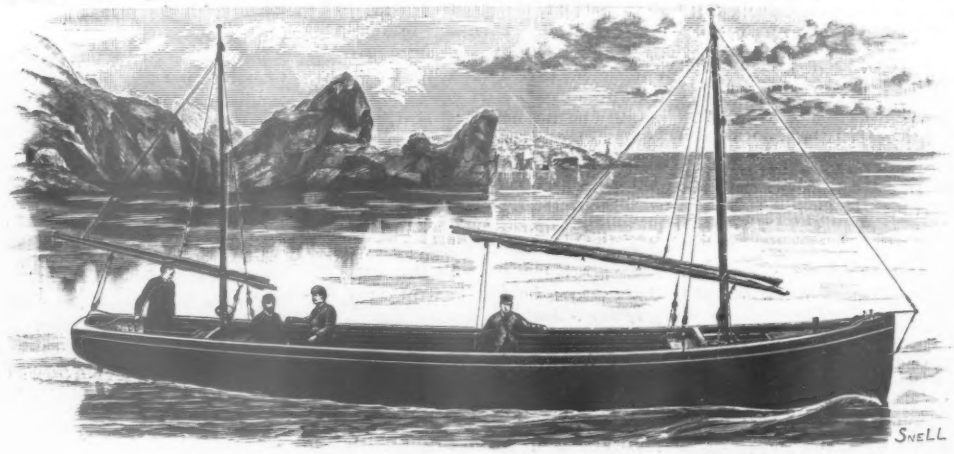


FIG. 1.—WOODHOUSE & RAWSON'S ELECTRIC LAUNCH "ELECTRIC."

The Westinghouse Electric and Manufacturing Company, of Pittsburgh, Pa., have opened an office in Atlanta, Georgia, in the Venable building. The new office will be under the direction of Mr. D. A. Tompkins, general district agent for the company in the South, and Mr. C. B. Osgood, special representative of the railway department. Mr. Tompkins' headquarters will remain at Charlotte, N. C., as heretofore.

The Allentown, Pa., City Council has decided to tax the electric railway company $25 for each car in use.

Kennedy's Electric Lamps Without a Filament.

BY R. KENNEDY.

In a series of experiments during the years 1881 and 1882, researching the properties of alternating currents and induction coils, some experiments were made with highly exhausted tubes and bulbs having two platinum wires entering as conductors, different currents and pressures of electricity being used to produce discharges through the vacuum; it was observed frequently that with high pressures from an induction coil giving a current with a frequency of about 150 waves per second, and a pressure which could be varied from 1,000 to 10,000 volts, we could raise the temperature of the platinum points entering the exhausted bulbs or tubes so high that they fused. The noticing of this effect led to the construction of the lamp shown in Fig. 1 (this figure is taken from a patent specification 4,752 of 1882).

The pencil-shaped conductor was a piece of Carre carbon, about 2 mm. diameter, such as was then used in Joel's semi-incandescent lamps, the other conductor was a button of carbon; both conductors were heated, when the current at high pressure from the induction coil was turned, and with about 7,000 to 8,000 volts the pencil rose to a temperature sufficient to melt the platinum wire to which it was attached; there was no appearance of anything like an arc, the pencil heated up uniformly all over; the button heated also, but its large mass prevented a great rise in temperature.

Figs. 2 and 3 are a plan and elevation of another lamp, from same specification; here, two extremely light plates were used, and the wires coated with insulating materials up to the point of contact with the plates.

The plates first used were made by carbonizing thin vegetable parchment paper. This lamp was better than the first, due to the smaller mass of the plates—they could be kept glowing—while the conductivity of the platinum for heat kept down the temperature at the points of contact, *b*, *d*.

This lamp also ended by the platinum wires, *b*, *d*, fusing close to the plates when the coil was turned on with all the pressure at command.

Figs. 4 and 5 are a side and edge view, respectfully, of another lamp; and Fig. 6 is a view of the other with spiral conductors *h*, *h*. In all of these lamps carbon was used and good effects obtained, the carbon glowing intensely, while the fusion of the platinum was not readily brought about.

Similarly constructed lamps were made with infusible oxides and mixtures, but carbon gave the best results, its only objectionable feature noted being the blackening of the bulbs, just as had been found with ordinary filament lamps.

The dynamo used was a Siemens Brothers' alternator, and a step-up induction coil about 12 to 1 ratio. A mercury pump of improved Geissler make was used for the vacuum making.

In all cases we used low frequency, 150 waves per second, and to prevent the current at high pressure discharging round the bulb from wire to wire outside, the wires were always entered from opposite sides.

I obtained my light in these lamps with high pressure and low frequency. M. Tesla obtains his light by using high frequency and high pressure combined.

I think some experiments were made in this direction by Mr. J. E. H. Gordon, and that he had a patent for a lamp worked by high pressure electrical discharge in a vacuum. I have not the number and date, but remember having my attention called to it when my experiments were going on.—*London Electrical Review.*

A Wonder of Telegraphy.

She—So she reached Paris yesterday! How wonderful it is that the news can be sent so safely over the ocean cable through so many miles of salt water.

He—Yes; and be so fresh.—*From Life.*

Influence of Temperature on Bismuth in the Magnetic Field.

BY DRUDE AND NERNST.

The magnetic field employed was about 7,000 C. G. S., and the magnets were specially arranged so that the metal under test could be kept at fixed temperatures while between the poles. The bismuth used melted at 267 degrees and was very pure. The "Hall effect" was first experimented on, and it was found that it slowly decreased as the temperature rose, till near the melting point it was from one-quarter to one-half what it was at 16 degrees; at the melting point it suddenly dropped to not more than one-sixteenth of the former value; and it is possible that even what was observed was a spurious effect, as in mercury (*infra*). It was shown

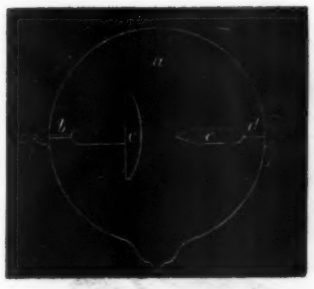


FIG. 1.

by Righi, in 1884, that there is an increase of resistance in bismuth when in a strong transverse field. The increase was also found to vary with temperature, the effect diminishing with increase of temperature; the increase of resistance when the magnet was excited being, roughly, 22, 8, 1 and .4 per cent., at 16, 100, 223 and 290 degrees, respectively. At the latter temperature, the melting point, Weber's observation was confirmed, that the resistance of the metal suddenly falls to about one-half.

Experiments with antimony showed a similar diminution of the Hall effect, but to a much less degree. With mercury there is an appearance of a Hall effect at ordinary temperatures about $\frac{1}{10}$ that in bismuth. It also increases in resistance, when in a magnetic field of 8,000 C. G. S., to the extent of about .2 per cent., but this may be more or less spurious, as the increase of resistance varies with the current flowing through the mercury.

Alternate Current Motor.

BY HUTIN AND LEBLANC.

This is an alternate current motor without commutator, working off any ordinary supply, and which does not require to be synchronized with the dynamo. It consists of two rings, one fixed and one movable, with two circuits on each; each circuit being wound to produce a like number of alternate north and south poles. To start the machine, the two movable circuits may each be independently closed through variable inductionless resistances. The two fixed circuits, in one of which is a condenser, are then joined in parallel to the supply mains, when the machine at once starts. As the speed gets up, the resistances are diminished and finally cut out altogether. It then runs perfectly as a motor, provided it is not required to give a greater torque than two-thirds of its calculated maximum. A motor has been built on this principle which, at 75 ∽ per second (the highest which could be obtained to try it with), gave 11 horse power, with an efficiency of 78 per cent. At 120 ∽, for which the motor was designed, it is calculated that it would give 20 horse-power at 88 per cent. efficiency.

An Invention Worthy of Munchausen.

A freak of lightning probably more remarkable than any hitherto recorded has occurred near the small village of New Salem, Vt., at the foot of the Heldeberg Mountains. Arent S. Vandyck occupies an old mansion, in the parlor of which hung a collection of revolutionary swords, one of which was heavily plated with silver. A terrific thunder storm came night before last, and one terrible crash aroused the household. All were stunned for a moment, but, recovering, they hastened to discover what damage was done.

Suddenly the younger Vandyck pointed to an old-fashioned sofa. Upon it lay what was apparently the silver image of a cat curled up in an exceedingly comfortable position. As far as the shape and posture of the animal were concerned, it might have been a live cat. Each glittering hair was separate and distinct, and each silvery bristle of the whiskers described a graceful curve as in life. Father and son turned toward the swords which hung upon the wall just above the sofa and there saw that the sword

FIG. 2.

had been stripped of all its silver. The hilt was gone and the scabbard was but a strip of blackened steel. The family cat had been electroplated by lightning.

In one of the panes of glass in the window, was found a round hole about the size of a half dollar, where the lightning had evidently entered. There was a charred streak across the sash, where the electrical fluid had made its way to the sword, down which it had passed to the cat, carrying with it the silver, which it deposited upon the animal. Of course, the cat was instantly killed, and, therefore, remained in the position in which it was quietly sleeping when the flash came. It is thought the plating of the cat's body will prevent decay, and that probably it may be retained among the collection of curiosities, which is more remarkable than all. Local scientists are puzzled, and one of their members of the Albany Institute is investigating the case.—*St. Louis Republic.*

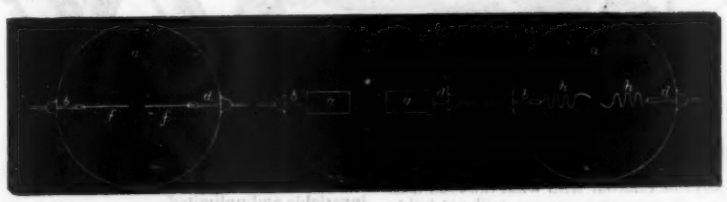


FIG. 5. FIG. 4. FIG. 6.

Case-Hardening by Means of Electricity.

Prof. Elihu Thomson has recently devised a method of case-hardening iron or steel by means of the heat produced by the passage of an electric current. His process consists essentially in heating the object electrically, and then applying to the metal so heated a surrounding envelope—either gaseous, fluid or solid—for the purpose of changing or preventing change in the quality of the material, according to the special end to be attained.

ELECTRIC LIGHT NEWS

—— The Ware, Mass., Electric Light Company has voted a three per cent. semi-annual dividend.

—— The Hackettstown, N. J., Electric Light Company has declared a dividend of five per cent.

—— One hundred and fifty electric light poles have been put up in the Brooklyn Navy Yard during the past week.

—— The Niles, Ohio, council decided, at a special meeting, to build an electric light plant with a capacity of 50 arc lights.

—— The capital stock of the Urbana, O., Electric Light and Power Company has been increased from $30,000 to $50,000.

—— The Frick Company, which owns some very large coal mines, intends fitting up all its shafts with electric light plants.

—— An incandescent electric lighting plant is to be put in at the South Keene, N. H., furniture shops, to be run by water power.

—— A cross illuminated by 52 incandescent lamps is to be placed on the spire of the Wesley M. E. Church at Minneapolis. The electrical work will cost about $600.

—— The El Paso Electric Light Company, of Colorado Springs, Colo., is about to erect a large addition, costing $35,000. Fifteen hundred incandescent and 35 arc lights will be added to its capacity.

—— The Richmond Light, Heat and Power Company, of Staten Island, has purchased two 75 light Wood arc dynamos for use in the new station to be erected in place of the one recently destroyed by fire.

—— The new electric light contract will cost the city of Northampton, Mass., about $7,000 yearly. It provides for 110 arc lights at $67.50 a light, and is to be in force for two years. The former price was $75 per light.

—— The Brooklyn, N. Y., Park Commissioners are in favor of lighting the driveways in Prospect Park with electric lights. A number of accidents have occurred owing to the darkness caused by the dense foliage.

—— Electric light men are planning quite generally to attend the Montreal convention. This is as it should be. The selection of Gen. C. H. Barney, a gentleman of much experience in such matters, as general manager of the exhibition was a happy idea, and exhibitors are now sure of the best treatment possible.

—— The Taxpayers' League, of Kansas City, Kan., has made an investigation of a scheme to sell an electric light plant to the city for $340,000, and claims to have discovered that the price is $300,000 too high. Circulars have been scattered broadcast over the city characterizing the scheme as "a flagrant and manifest job."

—— Col. H. C. Adams, Eastern manager of the Fort Wayne Electric Company, has changed his offices at 115 Broadway to Rooms 29 and 31, on the same floor. The new rooms are much better lighted and more convenient. This office is kept busy with new electric lighting work; a recent sale being 60 arcs and 650 incandescent lights for Cuyahoga Falls, Ohio.

—— The following figures show the number of local companies started by the Thomson-Houston Electric Company in each of these years: In 1886, 65; in 1887, 132; in 1888, 123; in 1889, 161; in 1890, 168. Eighty-seven have already been started this year, many are in process of organization, and it is probable that this will be the largest year in the history of the company.—*Boston News Bureau.*

The Wightman Electric Railway System.

The Wightman Electric Manufacturing Company, of Scranton, Pa., has recently developed and put upon the market the railway system illustrated herewith. In Fig. 1 of the accompanying illustrations, for which we are indebted to *The Street Railway Journal*, is shown a 20 horse-power motor mounted on a truck. The motor is of the single reduction, iron-clad type, and flexibility in suspension is secured by using a flat steel spring, supporting the end of the motor farthest from the car axle. The field magnets are of the "Kennedy" type. The gears can be exposed by removing the case, which is hinged like a pair of shears, the two halves swinging one inside the other, exposing the armature pinion after loosening one bolt or thumb screw.

The motor dismounted from the car is shown in Fig. 2, and in Figs. 3 and 4 the armature and a field coil are shown. The Gramme ring type of armature is used, mounted on strong brackets forming part of the magnet frame. Self oiling, dust-proof bearings are used. Grease, oil, or both combined, may be used in these bearings. Only two brushes, separated by an angle of 90 degrees, are used, the commutator bars being cross-connected. These cross connections are symmetrically wound, the cables being formed in a flat disk which is bolted to the head of the commutator, avoiding vibration and risk of breakage. The arrangement of the whole machine is of the simplest character, and any part can be dismounted and examined with the greatest ease. Either field winding can be removed without disturbing the other or the armature.

Mr. Wightman's aim has been to secure a railway system of the highest possible electrical and commercial efficiency, combined with simplicity, durability and strength. He believes in motors of large capacity, arguing that whatever is lost in greater expenditure of fuel, will be more than made up by the decreased repair accounts.

The armature resistance of the 20 horse-power motor is .75 ohm, and that of the main field coils .15 ohm. Under a severe test the commercial efficiency of the Wightman motor, was found to be 87 per cent. Cars equipped with two 20 horse-power motors have frequently attained a speed of over 20 miles per hour on a level track.

In Fig. 5 is shown the controlling switch, having five speed contacts on each side of the stop. The speed controlling handle and reversing handle are combined in one, so that a movement to the left causes the car to go forward, and a movement to the right causes it to go backward.

This new system is in operation at Auburn, N. Y., Scranton and Easton, Pa. The company's Scranton factory is considerably behind the orders already in hand for apparatus.

The officers of the company are: J. R. McKee, president; Merle J. Wightman, vice-president and electrician, and Herman Bergholtz, general manager.

The McDougall System on the Steinway and Hunter's Point Railway.

A pleasant little outing was afforded the representatives of the leading electrical journals on the afternoon of August 18, on the invitation of Mr. Alfred D. Moulton, superintendent of the Steinway and Hunter's Point Railway Co. They were afforded the opportunity to take a run over his lines in the new electric car equipped with the McDougall storage system.

The party was met at the Long Island terminus of the Ninety-Second street ferry, where the car awaited them, by Mr. Moulton, Mr. McDougall, the inventor, and Mr. Townsend Wolcott, the chief electrician. The motor, which, with its full complement of 140 cells, will develop over 25 horse-power, is located directly in front of and attached to the rear axle, to which the power is communicated. This leaves the forward axle entirely free, and as the car is fitted with a flexible suspension, also the invention of Mr. McDougall, its ability to round curves easily, and without grind or wear on either the wheels or rails, is greatly increased.

When the party had examined the car inside and out to their entire satisfaction, they climbed on board, Mr. McDougall manned the throttle, and the run to North Beach, a distance of about three miles, began. Some little distance up the road, and on a heavy grade, a loaded car was overtaken, and its pace not being fast enough to suit Mr. McDougall, he quietly ran up behind and "boosted" it up the hill, a favor, no doubt, greatly appreciated by its four-footed motors. This obstacle to electrical progress being disposed of on a convenient switch, a quick run was made to Steinway, where the power and ability of the motor to work both ways was demonstrated by a switchman, who, becoming a little "rattled" at seeing

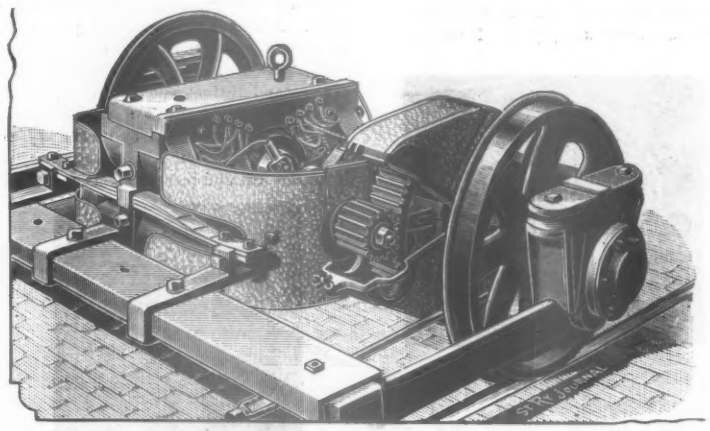


FIG. 1.—TWENTY HORSE-POWER WIGHTMAN ELECTRIC MOTOR ON TRUCK.

the car bearing down on him at such unusual speed, turned his switch the wrong way and shot the car round a sharp curve leading to the stables. Mr. McDougall reversed his lever, quickly backed off the switch onto the main line, and the switchman having by this time recovered from his excitement, the run to the beach was made without further incident.

Arriving there, the party were escorted to the hotel, which Mr. McDougall immediately bought, with its contents, and placed at the disposal of his guests. They were in no way backward in showing their appreciation of his kindness and passed the time very pleasantly until the homeward trip began. The car was taken as far as Steinway, where Mr. Moulton did the honors, conducting the

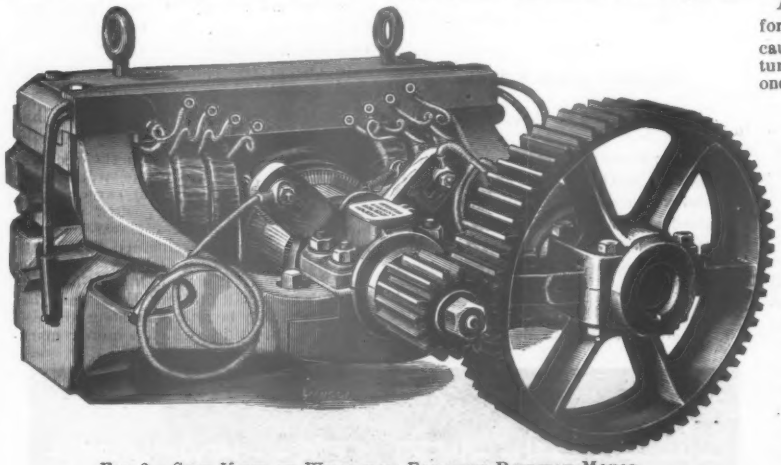


FIG. 2.—SIDE VIEW OF WIGHTMAN ELECTRIC RAILWAY MOTOR.

party through the extensive shops and stables of the company.

Any one familiar with what the road used to be not so many years ago will not fail to give the able superintendent the credit so justly due him for the wonderful improvement in the entire plant since the management fell into his hands. The company now operate 33 miles of road, have a rolling stock of something over 70 modern cars and about 300 horses in their stables.

Mr. Moulton has left two beautiful specimens of antiquated rolling stock in the yards, presumably for comparison, in which he certainly has nothing to fear. As the party passed, one of the cars was occupied by an equally antiquated goat, who looked thoroughly contented with his surroundings, and contemptuously indifferent to the marks of progress about him.

After the examination of the stables, Mr. Moulton led the way to his office, where, after many mutual congratulations and expressions of good-will, the party dispersed.

The Utilization of the Power of Niagara Falls, and Notes on Engineering.

ABSTRACT OF PAPER READ BEFORE THE FRANKLIN INSTITUTE, BY COLEMAN SELLARS, E.E.

The Falls of Niagara, always regarded as a wonderful work of nature, have more recently been looked upon as a possible source of water-power beyond anything that at present we know of. Niagara itself seems to be so situated in respect to the population of the United States as to be a place to which manufacturers might naturally go. The railway facilities are abundant, labor is cheap in the surrounding neighborhood, it is on the line of water communication from the great Lakes, and also, what is of the greatest importance, near to the largest markets.

The drainage area supplying the falls is enormous, amounting to more than twice the area of the United Kingdom of Great Britain and Ireland. The length of shore line of lakes and rivers is about 5,000 miles.

There is a fall of 326 feet between the water level of Lake Erie and Lake Ontario, which mostly occurs in the vicinity of the falls. The average discharge of water from Lake Erie into the Niagara River is estimated at 265,000 cubic feet per second, while the extreme limits of variation in the depth of the river above the falls is three and a half feet, so that practically the flow of water is invariable and unlimited.

On the proposition of Mr. Evershed, one of the surveyors of New York State, who proposed developing the power of Niagara Falls, several gentlemen busied themselves with the subject, and asked Mr. Sellars to report upon the cost of transmitting power by electricity as compared with the cost of generating power by steam at any given location. Having carefully examined Mr. Evershed's scheme, it was found to be feasible, and that if 20,000 horse-power could be let out at rental out of the total 120,000 horse-power that was talked of being used, a reasonable rental would pay interest on the investment expended in plant and purchase of land. A company was, therefore, formed with Mr. Adams, a New York banker, as president. Accompanied by Mr. Adams, Mr. Sellars visited Europe to examine various methods employed there in transmitting power to a distance. But as the main thing was to find out the best means of transmitting power of Niagara Falls to Buffalo, etc., and to get at a knowledge of the exact state of the art of developing water-power as well as transmitting the power, it was proposed to interest Sir William Thomson and make him president of a commission to consider plans to be submitted by selected engineers.

Although Sir William Thomson's statement, some years ago, that New York and other distant cities would be lighted from the Falls of Niagara, has not yet been fulfilled, still substantial progress has been made in the art of transmitting power by electricity, and advance is being made every day.

It was somewhat difficult to find men to act upon a commission with Sir William Thomson to consider the subject, because the majority of those who were noted for their scientific pursuits were already retained by one or the other of the various electrical companies or companies for the transmission of power, and *it was not very easy to get any who were free and could act without bias in a commission of this character.*

Finally, Col. Th. Turrettini, the mayor of Geneva, was selected as the representative of Switzerland, because he was a noted hydraulic engineer, who had made all the improvements on the river Rhone at Geneva, whereby the individually-owned water-wheels were swept away, and the power of the river was transferred to all parts of the city by pipes conveying water from one central station, the water first being pumped into reservoirs on the surrounding hills, and brought down to the town at two different pressures to suit requirements. Colonel Turrettini adopted the hydraulic method because the Swiss were accustomed to hydraulics, and look upon their mountains and the streams flowing thence as their coal mines. During the past years small streams that had previously run but a single small flax mill have been made to drive tens of thousands of spindles by the improved mode of utilizing this water, and the Swiss people found that they had the means of developing a great deal of unused hydraulic power.

America, however, is in a better situation for the use of power than Switzerland, because there are more uses for the manufactures, and more markets for the goods. Colonel Turrettini would not repeat the hydraulic plant which is in use in Geneva, but would, in all probability, if called on to do the work again, employ electricity. The much lauded rope transmission is being given up throughout the country for electrical transmission, which is said to be paying its way.

A paper mill near Grenoble, in France, was operated by steam. It did not pay, so it was proposed to take water power from the mountains, about five miles off. In the Winter it is impossible to reach these mountains, where the wheels are placed, and communication can only be held by telegraph or telephone. For nearly two years this paper mill has been worked by a continuous current plant, at an estimated efficiency of 55 per cent. They are now about to duplicate their machinery and rent power at the reputed profitable rate of about £4 per horse-power per annum.

The commission was eventually composed of Sir William Thomson, president; Coleman Sellars, professor of mechanics at the Franklin Institute, as representing the company and the United States; Col. Th. Turrettini, for Switzerland; and Prof. E. Mascart, of Paris, to represent France; with Prof. W. C. Unwin as secretary. By the kind permission of the directors of the Central Institute of the Guilds of the City of London, the headquarters of the commission was established in a room at the Central Institution building at South Kensington, where many conferences were held and correspondence conducted. At the early meetings of the commission the persons were selected whose advice was deemed of great value, and these engineering firms and individuals were asked to submit plans:

1. Of the generation of the power by turbines or other water motors.

2. For the transmission of the power so generated to the factories on the land of the

company, and then to an area within a two-mile radius from the central station. After that to Buffalo and Tonawanda, or to an area contained in a circle within a radius of 20 miles.

Substantial prizes were offered, besides which, all who sent in plans and estimates in accordance with the specifications were to be paid a sum of money to compensate in some degree for the labor expended. The plans and estimates came in on the last day of 1890, but were not considered until about a month later. The session of the commission lasted one week, and was conducted with great care and dignity, mainly in French.

Some of the estimates submitted were remarkable, illustrated by costly drawings and accompanied by volumes of valuable information. The whole of the plans were so duplicated that each member of the commission had a set of drawings, specifications, estimates and of the written explanations, for his sole use.

All these schemes were based on what the company had already begun. A tunnel requiring about 490 square feet of rock excavation is being driven from above Port Dey, where the existing hydraulic canal takes its water, on the land of the company under the town of Niagara, to a few feet below the Upper Suspension Bridge, a total length of 6,700 feet, to be extended up stream farther, as required, when the mill sites may be occupied. Only the lower end of the surface canal, as designed to feed the wheels that are to discharge into the tunnel, will be at present built.

It has been asked why use a tunnel for a tail race and place the mill sites above the falls, when a more natural plan would be a duplication of that existing. The chief reasons why it cannot be done is that there is no land at a reasonable price available, and that public opinion is against manufactories being built on the edge of a stream so as to spoil the beauties of the cataract. The advantages of a tubular tail race is that the water can be discharged at a much higher velocity than by a canal, in the proportion of eight to one, and does not interfere with the surface of the land.

The plan proposed by Mr. Evershed contemplated a number of surface canals entering the lands of the company at right angles to the river, and passing from the tunnel, which was to extend under the new town. This plan was changed to one canal with lateral branches.

There will be a central station for the generation, first, of about 5,000 horse-power by compressed air, another one of 5,000 horse-power by electricity, with a possible extension of either of these to the amount of 100,-

FIG. 4.—FIELD COIL, WIGHTMAN ELECTRIC SYSTEM.

000 horse-power, added by degrees to either, in whichever direction proves the most profitable and is called for by manufacturers. The company intend to proceed with caution and to avoid mistakes, and have placed the matter in the hands of a board of engineers, consisting of Mr. Sellars as chairman, Colonel Turrettini, as foreign consulting engineer, and several other engineers.

Should the Niagara Power Company find customers for 120,000 horse-power, the depth of water passing over the falls will not, it is calculated, be affected more than a single inch, not sufficient to make any perceptible difference in the appearance of the falls. One hundred and twenty thousand horse-power would furnish power to drive machinery capable of finding employment for 250,000 men; that is to say, about two men to one horse-power. The Baldwin Locomotive Works employs 5,000 men and utilize 2,500 horse-power; William Sellars & Company, 600 men and about 300 horse-power; the latter firm manufacture shafting, and have learned during their long experience that seldom more than 50 per cent. of the power transmitted by shafting reaches the machines, and this efficiency decreases the farther the power has to be transmitted.

Wire rope transmission is more economical than shafting, but all these methods are being replaced by electrical means. It is estimated in Switzerland that power may be transmitted 15 miles at a cost of less than £12 per horse power for actual cost of machinery, etc. There are some men in England who believe that it can be done cheaper than that.

Mr. Sellars says he was much gratified by what he saw in Europe. He was interested in the Deptford installation, and calls Mr. Ferranti a very venturesome mechanic, and thinks that the 10,000 horse-power unit may be suitable for a gigantic city like London, where light is often wanted by day as well as by night. Being invited to see a repetition of the experiment wherein a man drives a chisel through the concentric cable, with 10,000 volts alternating being transmitted, without suffering personal damage, the offer was declined on the ground that it was known to be perfectly safe, if the chisel strikes both the outer and inner copper conductors; but if a small portion of the outside copper casing be cut away, and then an attempt be made to cut the inner copper, the operator would be instantly killed.

Mr. Brown, of Oerlikon, by means of oil transformers, has experimented on the transmission of electricity at 30,000 volts, and is bringing to Oerlikon the power of a water-

FIG. 5.—CONTROLLING SWITCH, WIGHTMAN ELECTRIC SYSTEM.

fall a number of miles, and intending to drive the whole of the machinery there by electricity.

At Rome they are about to bring electrical power from Tivoli by naked conductors at 5,000 volts, to be lowered to 2,000 volts before entering the city by underground concentric cables, and then lowered by other transformers to enter the houses.

Ganz & Company, one of the firms which submitted plans to the Niagara International Commission, erected the present plant at Rome, using the alternating current and the three-wire system; arc and incandescent lamps are operated conjointly by the same three wires.

The alternating current seems to come to the fore on account of the ease with which it can be transmitted a long distance by slender cables, and the voltage can be varied at pleasure.

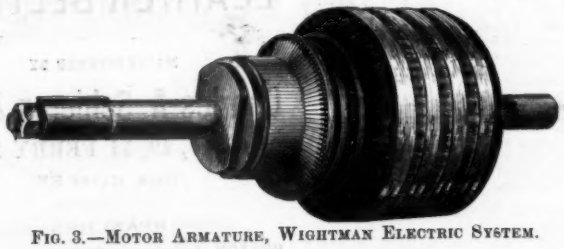


FIG. 3.—MOTOR ARMATURE, WIGHTMAN ELECTRIC SYSTEM.

Mr. Sellars accompanied Prof. George Forbes to see the Mordey alternator at work in London, where they operated a generator as a motor, giving it work to do to the extent of 50 per cent. more than its calculated capacity, without its showing the least fatigue, and after half a day's work not even being warm. There was no trouble with it; the speed was constant, whether load was taken off or put on; for when the driving power is constant and uniform in its speed, the motor driven by it is in perfect step.

Speaking of Prof. G. Forbes, Mr. Sellars remarks that he was much impressed by his bold stand in favor of the alternating current, and his command of the subject as an educated engineer, in presenting his plan of utilizing the power of Niagara; and looking back to the meeting in London, and his opportunity to meet men noted in scientific engineering, some among them seem to tower mentally over others, and one can readily feel that such men are masters.

In Rome, where they first demonstrated practically the running of alternators in parallel, coupled electrically only, Dr. Mengarini has adopted 600 horse-power as a unit plant for steam driving, and 350 horse power for the unit when driven by water at Tivoli. On the very stones placed by Cæsar stands the foundation of the engines that now furnish light by gas and electricity to the city of Rome.

The development of compressed air at Niagara merits consideration, since a good authority states that 50,000 horse-power can be carried 20 miles through two pipes 26 inches in diameter, and it will enable existing factories to utilize their present engines; at all events until such time as electricity is more universal. Mr. J. Pearsall, an Englishman, who presented plans to the Commission, says that the best way to generate the power by compressed air is to do it by hydraulic ram, wherein, in place of the valve closed with a slam by the current, he has introduced a set of valves driven by a separate power.

One thing observable in Europe was the almost universal use of the slide rule for calculations, and Mr. Coleman Sellars advises all young electrical engineers to obtain a mastery over the use of the instrument.

The Fibrone Company in Trouble.

Deputy Sheriff Heimberger, on August 13, took possession of the factory of the Fibrone Manufacturing Company, at 300 Monroe street, New York, on executions for $19,704 in favor of the following creditors: Thomas H. Wheeler, $15,525; Kasebier & Vigelius, $1,583; Elisha H. Allen, $1,298; Frederick H. Allen, $1,298. The company manufactured fibrone and plasticon in competition with celluloid and zylonite. The company was incorporated in January, 1890, with an authorized capital stock of $60,000, which was increased in March last to $100,000. A large amount of money was spent on the plant and in pushing the business, which was increased so as to manufacture electrical and telegraph appliances.

The Vincennes Electric and the Central Thomson-Houston companies have asked for an electric railway franchise at Vincennes, Ind.

NEWSPAPER ADVERTISING.

SIXTH OF A SERIES OF ARTICLES ON THIS IMPORTANT BRANCH.

The sixth of our series of advertising articles is from the pen of Mr. J. G. Biddle, who places the advertising for that old and well-known house, Queen & Company, of Philadelphia. Mr. Biddle's remarks are in the nature of a double-barreled shotgun—one load for the advertiser and the other for the solicitor.

A WORD TO THE WISE.

TO THE EDITOR OF ELECTRICAL REVIEW:

The object of this column, as announced by the ELECTRICAL REVIEW, is a "broad discussion" of the advertising question, to benefit the business men with goods for sale, rather than the auctioneer. The following remarks are granted "preferred space" through the kindness of the editor, rather than for any bearing which they may have upon the immediate subject set for copy.

Considering the fact that so many opportunities are daily offered for "reducing the surplus" through the medium of advertising, it is hardly possible for each and every paper to be the *best* and have the *largest circulation*, and yet we are frequently informed that such is the case as regards the journal which may be under consideration. The returns promised from a card in "the only paper" are as golden goose eggs, which will be laid periodically at our feet in the shape of orders, and which would not materialize from any other source.

In this way the awful responsibility of neglected opportunities is thrust upon us, and he who resists such logical reasoning must, indeed, be neglectful, to say the least, of his own interests.

If there were less of this intense pressure, it would certainly be much more pleasant to the advertiser, for it is quite impossible, unless the appropriation is unlimited, to patronize all of even the good journals. Discriminations must be made, and for special reasons one house may find it advantageous to use the columns of certain papers which are not so well adapted to the wants of other manufacturers in the same line, although the journals separately patronized may have equal standing.

While enterprise is necessary to the success of any undertaking, and he who talks loudest will be heard the greatest distance, yet our friends of the press must remember that while they, as individuals, know only the journals with which they are respectively connected, we, as advertisers, are acquainted with their contemporaries as well as themselves.

For instance, it would not be advisable for the business manager of the ELECTRICAL REVIEW (or any other paper for that matter) to become suddenly egotistical, and forget that other business managers of other journals of merit talk into the same attentive ears.

The words of wisdom thus received are carefully weighed, and, of course, the paper with the "largest circulation" receives our immediate support.

If, therefore, friendly words of caution may be extended to our brothers of the press, they are these:

Don't make any claim which cannot be demonstrated to the satisfaction of your listener; and don't secure an advertisement by force, *i. e.*, by the use of undue influence, if you find an advertiser prefers not to sign a contract without time for consideration.

Truly yours,

J. G. Biddle

Philadelphia, August 22, 1891.

The People's Electric Street Railroad Company has been incorporated to build a line from Bridgewater to Freedom, in Beaver County, Pa.